

# A miniature microscope for fluorescence imaging

**Client:** Prof. Matthew Merrins

**Advisor:** Professor Jeremy Rogers

**Team:**

|                        |                                     |
|------------------------|-------------------------------------|
| <b>John Rupel</b>      | jrupel@wisc.edu (Team Leader)       |
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**Date:** 03/15/2017- 03/28/2017

**Problem Statement:** An affordable miniature fluorescence microscope needs to be developed the excitation source should be an LED with a wavelength of 430nm and filters will be required to filter 470 nm and 535 nm light.

**Last Week's Goals:** Wire LEDs and make them blink. Prepare the camera for testing.

**Summary of Team Role Accomplishments:**

- John: John wired the circuit with the purchase LEDs. The set up is ready for testing on Friday. Visited with Professor Merrins on Friday.
- Kadina: Worked with John to wire the circuit and put together an LED holder to use with Professor Merrins' microscope. Met with Professor Merrins on Friday.
- Kaitlyn: Met with Zach to finalize the 3D SolidWorks design. Wrote rough draft of IDR and executive summary.
- Zach: Met with Kaitlyn to finalize the 3D SolidWorks design. Wrote up email to the shop to get holder design printed to be used from testing.

**Summary of Design Accomplishments:**

- Programmed lights to turn on and off with a push switch
- Prepared a holder for LEDs
- Met with Merrins. Set up a time for testing the LEDs

**This Week's Goals/Individual Goals:**

**Kaitlyn:** My goal this week is to meet with Zach to 3D print additional piece. By Tuesday I want to have completed a rough draft of the executive summary for the Tong award.

**Kadina:** My goal this week is to integrate the 430 nm LEDs with Arduino and download the software needed to control the camera. We want the LEDs to flash at the same time a picture is taken. I also want to do testing of the setup with samples.

**Zach:** My goal this week is to obtain our updated printed LED holder and sample platform for evaluation and testing. I hope to update the model one last time if errors still exist and hope more that I do not have to do this.

**John:** My goal this week is to test the LEDs and camera on Professor Merrins microscope.

### **Project Difficulties:**

Still need to figure out how to take a video or seires of rapid images with the camera

### **Same Challenges:**

- Picking out a specific tube lens with proper focal lense.
- Automate image processing
- Address potential bleed through
- Need to figure out how to take images with the camera

### **New Challenges:**

### **Tasks Completed by Team Members:**

**Kaitlyn:** Finished SolidWorks design. Wrote rough draft of IDR and executive summary for the Tong award.

**Kadina:** Emailed Professor Merrins to setup a time to test the 430 nm LEDs

**Zach:** Finished SolidWorks design.

**John:** Programmed the 430nm LEDs with Arduino and I met with Professor Merrins.