

# A miniature microscope for fluorescence imaging

**Client:** Prof. Matthew Merrins

**Advisor:** Professor Jeremy Rogers

**Team:**

<b>John Rupel</b>	jrupel@wisc.edu (Team Leader)
<b>Kadina Johnston</b>	kejohnston2@wisc.edu (Communicator)
<b>Zach Alden</b>	zalden@wisc.edu (BSAC)
<b>Kaitlyn Gabardi</b>	gabardi@wisc.edu (BWIG/BPAG)

**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:** Test LEDs and camera on Professor Merrins setup.

## Summary of Team Role Accomplishments:

- John: John made sure all the LEDs were receiving the same voltage and current in the LED setup. Figured out how to automate image taking with IC capture. Figured out how to make graphs of filter transmission spectrum on matlab. Submitted quotes for 430nm lasers.
- Kadina: Attached all the LEDs and wires to the holder on Thursday. Tested LEDs and camera on Professor Merrins setup on Friday. Met with team and worked on writing client, adviser, and team meeting entries.
- Kaitlyn: Finished executive summary and posted rough draft to google drive. Completed 3D printed prototypes and info on motor in team notebook. Did research on possible white LEDs as an alternative to use for our excitation source.
- Zach: Printed the LED holder. Tested LEDs and camera on Friday. Started research into alternative light sources for LED.

## Summary of Design Accomplishments:

- Tested LEDs and Camera on Professor Merrins set up
- Started research into potential excitation filters.
- Started research into alternative excitation sources

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

**Kaitlyn:** My goal this week was to research white LEDs with lower wavelength as compared to the current LEDs that were tested. Finish updating sections of team notebook.

**Kadina:** My goal this week is to research excitation filters we could use for a super bright white light. Otherwise we could test the same filter on the LEDs we have right now.

**Zach:** My goal this week is to design a holder for John's excitation filter and new LED setup and to research better LEDs/excitation sources than our current method.

**John:** My goal this week is to increase the current delivered to the LEDs as well as get a hold of an excitation filter from LOCI and schedule a time to perform additional testing on professor Merrins setup.

### **Project Difficulties:**

Need to address the issue of bleed through with the LEDs as well as increasing the intensity of 430 nm light onto the sample such that our camera would be able to pick up the signal.

### **Same Challenges:**

- Picking out a specific tube lens with proper focal length.
- Automate image processing
- Address potential bleed through

### **New Challenges:**

- Need to address excitation bleed through to detector
- Need to increase light intensity so that the affordable camera can pick up fluorescence.

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

**Kaitlyn:** Finished sections of team notebook, updated team website with all progress reports.

**Kadina:** Finalized the light source for testing and tested LEDs and camera with Professor Merrins. I also helped update the team notebook during the team meeting on Sunday.

**Zach:** Updated team notebook. Tested setup on Friday. Got latest 3D part for examination.

**John:** Tested LEDs and camera with Professor Merrins set up. Submitted quotes for 430 nm lasers. Plotted filter transmission spectrum with raw data provided from the manufacturer of the filters.