

# A miniature microscope for fluorescence imaging

**Client:** Prof. Matthew Merrins

**Advisor:** Professor Jeremy Rogers

**Team:**

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**Date:** 04/19/2017- 04/25/2017

**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:** Research alternative light sources and possible excitation filters

**Summary of Team Role Accomplishments:**

- John: Created graph for final poster. Filled in bullet points for final design on poster. Chose which excitation filter to use. Sent Professor Rogers OSLO file.
- Kadina: Continued to quantitatively analyze results from last week. Started poster. I wrote parts of the design criteria and assisted with overall design of the poster.
- Kaitlyn: Worked on poster with team, set up meeting time with WARF (this Friday at 10:30 in the Discovery Building), and worked on finalizing CAD with Zach.
- Zach: Attended last BSAC meeting of semester. Finalized proposed CAD design of entire microscope structure. Started poster.

**Summary of Design Accomplishments:**

- Purchased excitation filter.
- Made significant progress on Poster
- Submitted IDR, in process of meeting with WARF this week.
- Posted executive summary to the design webpage.
- CAD of microscope structure with current setup

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

**Kaitlyn:** My goal this week is to finish the poster for the team and begin the paper.

**Kadina:** My goal for this week is to practice for presentations with input from WARF (although it is a bit late). Also want to finish LabArchives and the paper.

**Zach:** Goal is to finish the poster, help with the paper, finish labarchives, and create a checklist of what should be done/suggestions I have for mechanical before I go on co-op.

**John:** My goal this week is to finish the poster and start the paper as well as schedule a time with Professor Merrins to test the excitation source with the cells.

### **Project Difficulties:**

- Trying to stay under budget for prototype.
  - Overall design will be under \$2,000 but this may be difficult to reach for the first prototype.

### **Same Challenges:**

- Picking out a specific tube lens with proper focal length.
- Automate image processing
- Need to address excitation bleed through to detector
- Need to increase light intensity so that the affordable camera can pick up fluorescence.
- Still struggling to determine how to use OSLO to choose objective and tube lenses
- Determine best method of image analysis

### **New Challenges:**

- Determined that we will bring on a new team member next semester. Zach will join us again/work with us down the road.

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

**Kaitlyn:** Zach showed me new techniques on CAD so we could complete final design. Looked into clamp mechanisms that we could use and researched possible stands (found cheap Dino-Lite stand to use). Worked on testing and final design on poster.

**Kadina:** I contacted Professor Merrins about attending the poster session and worked with the group on our poster.

**Zach:** Attended last BSAC meeting of semester. Finalized proposed CAD design of entire microscope structure. Started poster.

**John:** Purchased excitation filter. Created an optical simulation to choose tube lens. Created graph for poster.