

A miniature microscope for fluorescence imaging

Client: Prof. Matthew Merrins

Advisor: Professor Jeremy Rogers

Team:

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

Date: 04/11/2017- 04/18/2017

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: Maximized the amount of current to the LED which thereby maxed out the brightness of the LED. Measured the spectrum of the LEDs. Narrowed down two potential bandpass filters. Graphed optical density of 470 emission filter against potential excitation filters. Contacted LOCI to borrow an excitation filter
- Kadina: Proofread the IDR as well as the executive summary. Emailed Professor Merrins to get funding information for the IDR. Started to quantitatively analyze results from previous weeks test.
- Kaitlyn: Helped finish IDR and executive summary, downloaded OSLO, looked up filters to order.
- Zach: Measured spectrum of the LEDs with Campagnola equipment.
- **Summary of Design Accomplishments:**
- Narrowed down potential excitations filters to two.
- Researched alternative excitation sources
- Finished IDR
- Finished Executive Summary

This Week's Goals/Individual Goals:

Kaitlyn: My goal this week was to research filters to order, update team notebook, start adding research articles to individual notebook, and finish IDR and executive summary with the team.

Kadina: My goal this week is to determine a better image analysis method so that it makes sense on our poster and we can use statistics to determine if it can differentiate between cell and lactate.

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 get a hold of an excitation filter either through purchasing one or borrowing one from another lab. I also plan on starting the poster and cleaning up lab archives.

Project Difficulties:

Need to get a hold of excitation filter to perform testing on LEDs. Worried we may not have enough time.

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

New Challenges:

- Determine best method of image analysis

Tasks Completed by Team Members:

Kaitlyn: Finished sections of team notebook, IDR, and executive summary.

Kadina: Helped with the IDR and executive summary. Worked on beginning image analysis with FIJI so that we will have figures on our plot. Emailed orders.

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

John: Filled out section of the IDR emailed LOCI and Prof. Merrins to get a hold of excitation filter. Narrowed the choice of excitation filter to two choices.