A miniature microscope for fluorescence imaging

Client: Prof. Matthew Merrins
Advisor: Professor Jeremy Rogers
Team:

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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: Order LEDs and LED driver, start the filter swap design and focusing mechanism

Summary of Team Role Accomplishments:

- John: John programmed the Arduino to turn test LEDs on and off for a specified time. Additionally programmed the Arduino to turn a motor for a specific set of steps and once the motor has stopped the LEDs turn on for a specified amount of time. Also picked up 430nm LEDs from Professor Merrins as well as the camera
- Kadina: Emailed Professor Merrins to setup time to test LEDs with his setup
- Kaitlyn: Met with Zach to finalize the 3D SolidWorks design. Wrote up email to the shop to get holder design printed to be used from testing.
- 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 arduino to turn light on and off for a set amount of time
- Programmed Arduino to turn the motor as well as turn LEDs on and off.

This Week's Goals/Individual Goals:

Kaitlyn: My goal this week is to meet with Zach to finalize the 3D printed LED holder to we used for testing. Zach and I emailed the shop Tuesday night, and we hope to have it printed by this week.

Kadina: My goal this week is to integrate the 430nm LEDs with Arduino and donwload the software needed to control the camera.

Zach: My goal this week is to meet with Kaitlyn to finalize the 3D printed LED holder. We met on Tuesday to finish finalizing the exact dimensions of the holder. We also emailed the shop to hope to have it printed by the end of this week.

John: Need to integrate the 430nm LEDs into the Arduino setup. This will involve making sure the correct current is being delivered. Also want to test the LEDs with Prof. Merrins setup to make sure they are bright enough to excite the flurophores.

Project Difficulties:

We need to figure how to use the camera to take pictures and collect data.

Same Challenges:

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

New Challenges:

- Need to figure out how to take images with the camera

Tasks Completed by Team Members:

Kaitlyn: Finished SolidWorkds design.
Kadina: Emailed Professor Merrins to setup a time to test the 430nm LEDs
Zach: Finished SolidWorks design.
John: Programmed Arduino to control both the LEDs and motors.