A miniature microscope for fluorescence imaging

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

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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 submitted quotes for the camera. John also created an OSLO simulations of a potential tube lense. Additionally, John bought an 8-bit shift register because not only can be used in this project, but it can also be used for other personal electronic projects.
- Kadina: Performed OSLO simulations on potential tube lenses. Ordered camera, LEDs, and shift register.
- Kaitlyn: Made a list of potential motors to use for the filter swap.
- Zach: Ordered a stepper motor from amazon.

Summary of Design Accomplishments:

- Ordered Camera
- Ordered Motor
- Ordered LEDs, and driver
- Performed OSLO simulations

This Week's Goals/Individual Goals:

Kaitlyn: Figure out the necessary circuitry needed to control the stepper motor through the Arduino as well as research 3D printers that Professor Merrins can use to affordably print the microscope stand. Get 3D printing shop pass.

Kadina: Perform OSLO simulations with potential tube lenses. Do research into Arduino code that controls stepper motors.

Zach: Look into circuitry needed to control the stepper motor through an Arduino. Figure out where on the microscope stand would be a good place to house the electronics. Get a preliminary 3D print of our parts for inspection.

John: John plans to use the 8-bit shift register he found to test some Arduino software with. When the motor arrives, John plans to integrate the motor into the LED setup.

Project Difficulties:

Apparently Professor Merrins did not order the LEDs so the ETA on them are going to be extended. We need to figure out the circuitry to control the stepper motor

Same Challenges:
- Picking out a specific tube lens with proper focal lense.
- Automate image processing
- Address potential bleed through
- Waiting for LEDs to arrive.

New Challenges:
- Need to develop the circuitry to control the stepper motor.

Tasks Completed by Team Members:

Kaitlyn: Made a list of potential motors to use. Also explored Professor Roger's idea for using a wedge shape as a filter holder.

Kadina: Kadina ordered a camera and worked on the OSLO simulations.

Zach: Zach ordered a stepper motor and continued to develop the microscope stand.

John: Submitted quotes to several companies to order a camera. Performed a simulation with a potential tube lens on OSLO.