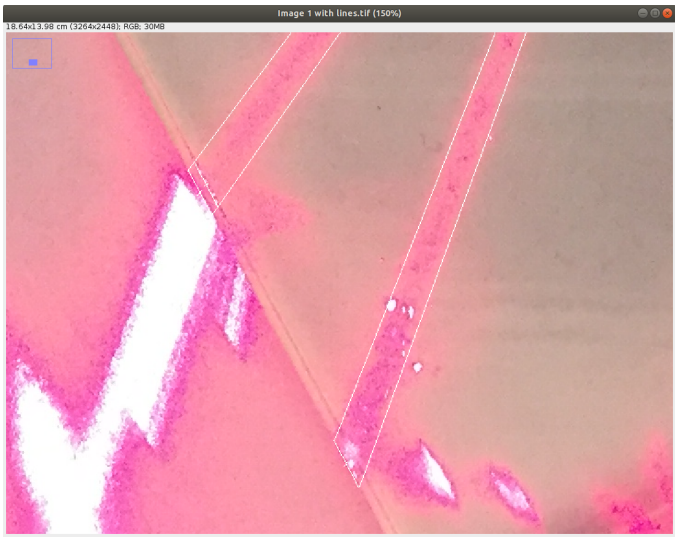
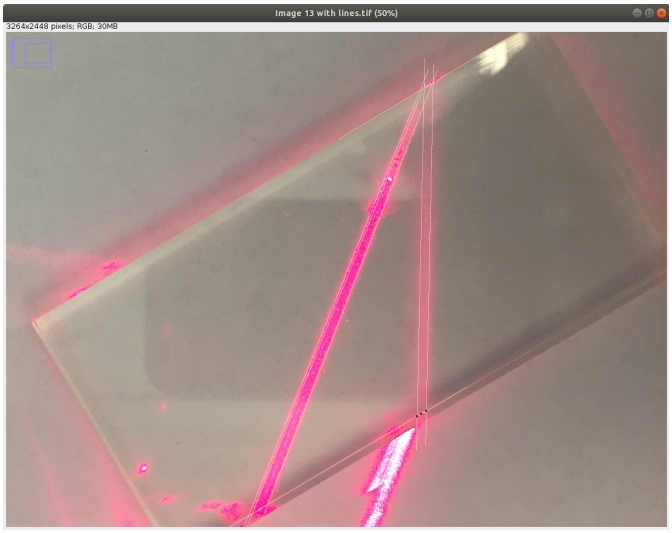
Email update 6/28

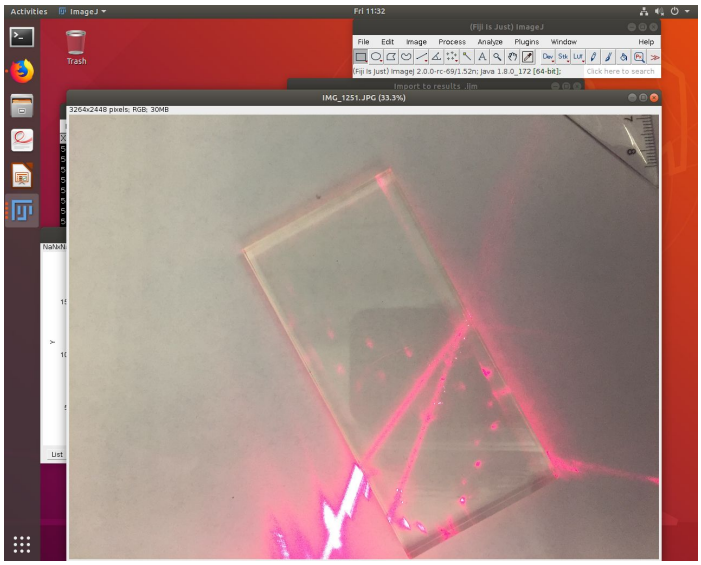
Dear Dr. Horn and Dr. Pegg,

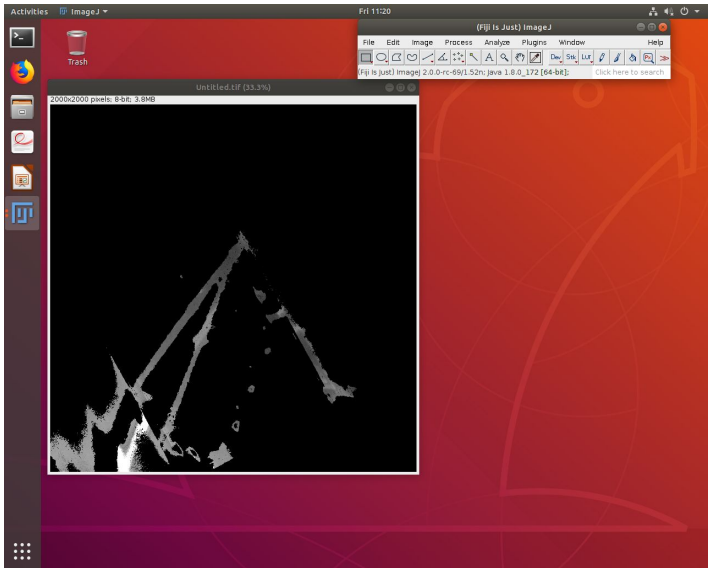
I wanted to send you an email to let you know what I have been working on a bit, and about the trouble I've been having getting imagej to work the way I want it to. I was hoping that one of you might have a suggestion, or know of someone I could ask for advice.
I started out by just seeing if I could measure the laser beam lengths in imagej. I traced the edges of the laser beam with the line drawing tool and divided the distances in half to get points from which to measure the lengths. The problem with this is that it is often hard to tell where the edge of the beam is, and I have been having trouble getting the incident and refracted beam lines to meet at the incident point like they are supposed to.

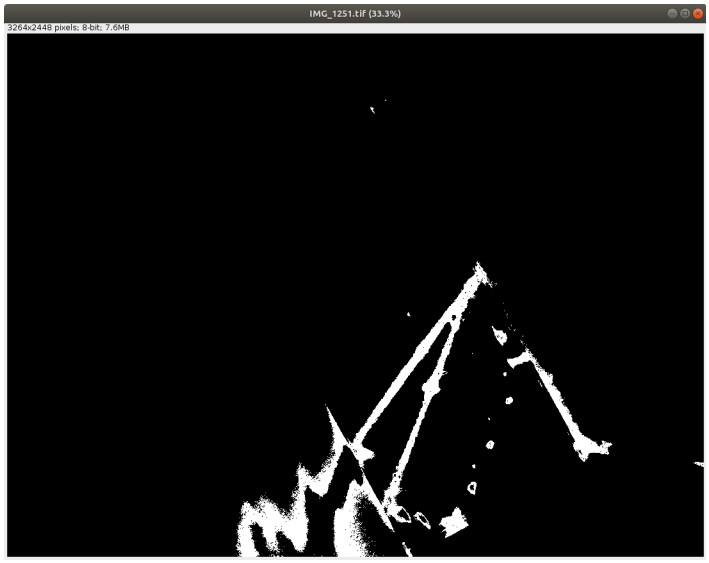




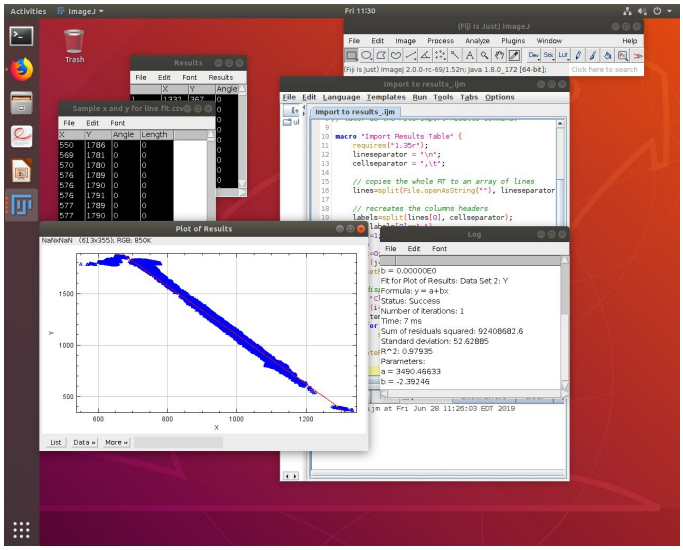
It also is generally a tedious process drawing all of the lines.
I decided to see if I could use the program to automatically select, trace, fit a line to and measure the laser beams in the crystal.
I have been trying to find operations within the program and macros online that could do parts or all of this. So far I have been able to put together a macro to remove the main part of the laser from the rest of the image and select it using a thresholding tool.







I spent a while trying to find a way for the program to recognize the prism and cut out that part of the image, so that the reflections of the laser on the paper wouldn't be included in the selection, but I haven't found a good way to do that.
I found a way to select all of the pixels outlining the laser image and find a line that would be a best fit for those points.



The picture that I used for the plot had a lower brightness than the other pictures, so these points were only for one section of the beam.
I haven't found a way for the program to automatically select only a the part of the laser that I need to measure so far.
Let me know if you have any suggestions for imagej or an idea for another program I could use for this.

Besides working on this problem, I have also been trying to find general information about the project, and what the aerogel will be used for.
I was wondering if I could get some more information about the aerogel. What is the chemical composition of the aerogel tile? Which properties do we already know? What is it's density? One of the articles that I received from Dr. Horn mentioned that their aerogel tile had a density related to the index of refraction by this equation $n = 1 + k\rho$, where k is some constant. From other articles I found, this seems like it wouldn't be true for all materials, but would it be true for our aerogel?

Thank you,
Helen