

SCORE CARD

OPTICAL INSTRUMENTS (formal lab)

LAB 10

6 points = 100%

Submitted by:

(1 point) Watch all of the videos found on the following webpage, in which I describe how a confocal microscope works.

<https://www.lightforfitness.com/physics-124-optical-instruments-formal-lab-exercise-suny-fredonia-by-professor-alan-haungs/>

(1 point) For the introduction of your lab report, give a very short explanation of the general principle of how a confocal microscope uses a lens and a pinhole and pinpoint-scanning to create sharper images than a microscope that only uses lenses to focus an entire image simultaneously. Be sure to mention the concept of "depth of field". For this explanation, you might find my other online videos helpful found particularly in the informal Optics lab and the explanations found on Wikipedia.

<https://www.lightforfitness.com/physics-124-optics-informal-lab-exercise-suny-fredonia-by-professor-alan-haungs/>

CONFOCAL MICROSCOPY (Wikipedia link)

(1 point) Download software (**FRED Photonics Engineering software, this software only works on Windows computers**) and open my created file called CONFOCAL MICROSCOPE, and then enlarge the hole found in the center of the plate, (which plate that is located between the lens and the light detecting plate).

Click here to download the free Optical Engineering Demo Software from Photon Engineering. Fill out the form and they will email a link to you. This demo version never expires. It might take a day or two for them to email the software download link to you. Let me know if you are having trouble.

(1 point) Include a picture of all of the colors of the rays of light passing through the enlarged hole in the center of the plate, after enlarging this hole found in the center of this plate (which plate is positioned in between the lens and the light sensing plate). NOTE: The student version of the software that you are using will not save any changes that you made to this file.

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(1 point) Due a search online or via a physical library to find two (2) pictures of the same microscopic item, but one picture taken with a lenses-only-microscope and one picture with a confocal microscope, and include these 2 pictures into this lab report.

(1 point) For the conclusion, site and explain how one manufactured/sold confocal microscope actually scans the sample with its precise focal point. Maybe you can find an example of a specific manufacturer and their confocal microscope that uses the same technique found in the original patent which utilizes the vibrating sample to facilitate either a 2 dimensional scanning pattern or possibly a 3 dimensional scanning pattern. But, more likely you will find that modern confocal microscopes do not move the sample but something else. Regardless of what you find, site the specific microscope, and the company that manufactures it and/or sells it, and briefly describe how it performs the focal point scan.

(1 point extra) For the student who might want more than a 100% to be averaged into their final grade. Describe minimally at least one weakness of the confocal microscope technology versus and plain-lens-only-microscope approach.