

## A collage of logos for CUNY, SUNY, Hunter College, and the City University of New York. The CUNY logo is in the top left. The SUNY logo is in the top right. The Hunter College logo is in the middle left. The City University of New York logo is in the bottom right.

1 Department of Physics— Hunter College CUNY, 2 Department of Physics— Stony Brook SUNY

A spectrometer is a scientific instrument that detects and analyzes the amount of light that the sample absorbs, probing its wavelength, frequency, and energy. The Spectrometer is so important in science missions, especially in astronomy, because it helps scientists to study and understand celestial objects, such as stars, black holes, and exoplanets, on how they produce light, how fast they move, and their chemical composition. Our goal for this research project is to build an affordable Near IR Spectrometer inspired by Yuan Cao, a postdoctoral researcher at Harvard. [1]

The diagram illustrates the Fourier transform setup. Light from a source passes through a lens to form a sharp image of the source at a slit. The light then passes through another lens and a reflective grating, with rays converging onto a screen.

*Figure 1*

Procured components of detector

Design and Assembly of detector circuit

- Soldering
- Desoldering
- Mounting

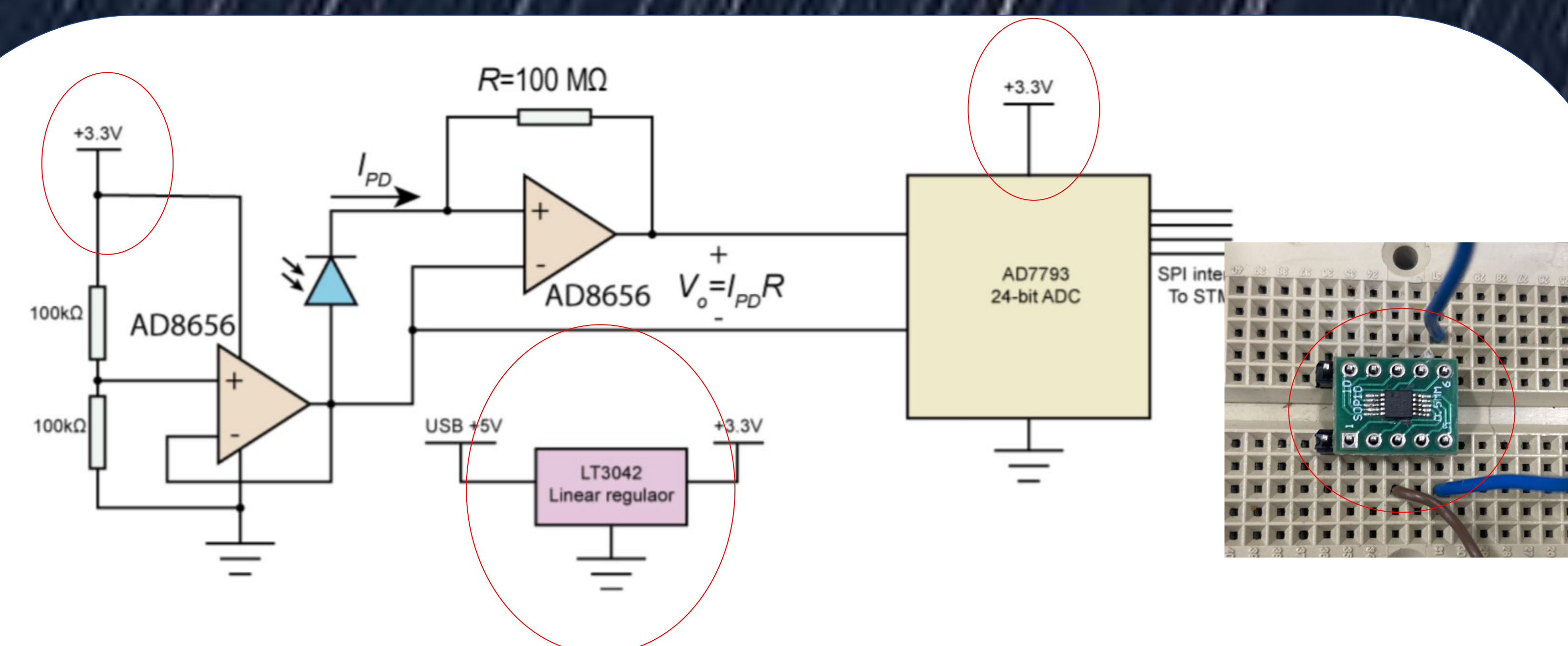


Figure 2

We collected and analyzed the electrical, mechanical, and optical materials for our inventory. Before the items arrived, I learned how to solder and desolder on PCBs with different types of materials (resisters, op amps, LED). Once we obtained the items, we discovered the linear regulator is very micro. It is impossible to solder it into a through hole PCB. Thus, we used a surface mount method to solder the chip. This step is crucial because the circuit depends on the linear regulator. To solder it, I used solder paste and a heat gun.

Currently, we have the linear regulator mounted on a PCB. Next, we want to continue finishing wiring the linear regulator schematic. After that, we will finish building the rest of the detector circuit design. Once the electric components are done, we can assemble the optical and motor parts of this project.

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[1] Y. Cao, *A \$500 DIY near-IR spectrometer that would sell for \$10,000, (n.d)*  
 Figure 1: Thorlabs.com - Spectrometer Educational Kits (2020) ThorLabs. Available at:  
[https://www.thorlabs.com/catalogpages/Obsolete/2020/EDU-SPEB1\\_M.pdf](https://www.thorlabs.com/catalogpages/Obsolete/2020/EDU-SPEB1_M.pdf) (Accessed: 02 August 2023).  
 Figure 2: Y. Cao, *A \$500 DIY near-IR spectrometer that would sell for \$10,000, (n.d)*