



Smartphone Multicolor Pyrometry

The Background

In 2015, there were 68,000 wildfires in the United States that damaged about 4,500 structures. One structure fire was reported every 63 seconds and one civilian fire injury was reported every 34 minutes.

Floating embers are a main factor for how a fire develops and spreads, but little is known about their characteristics.



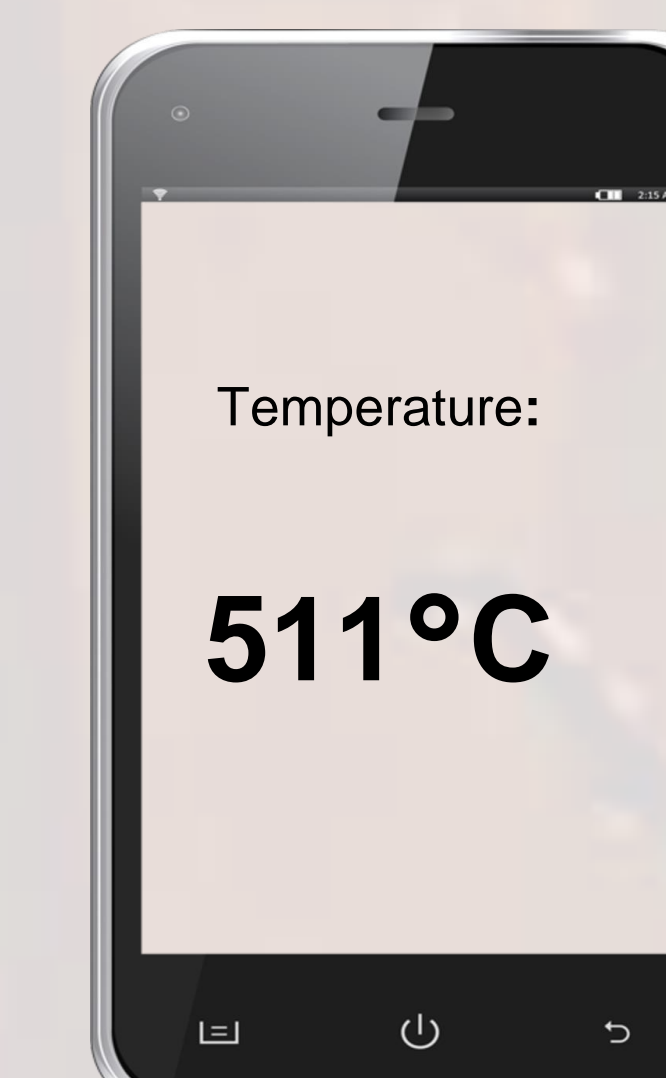
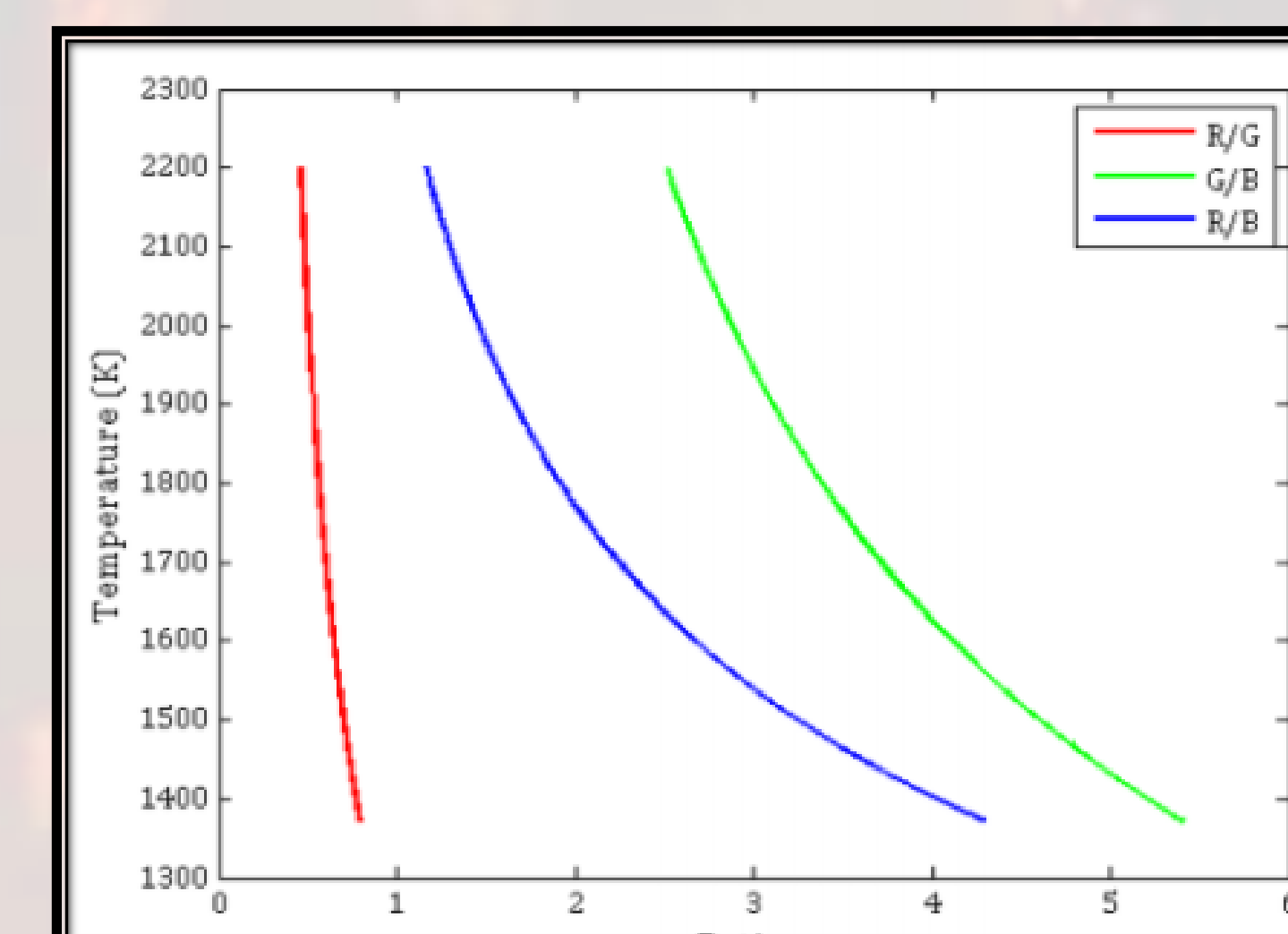
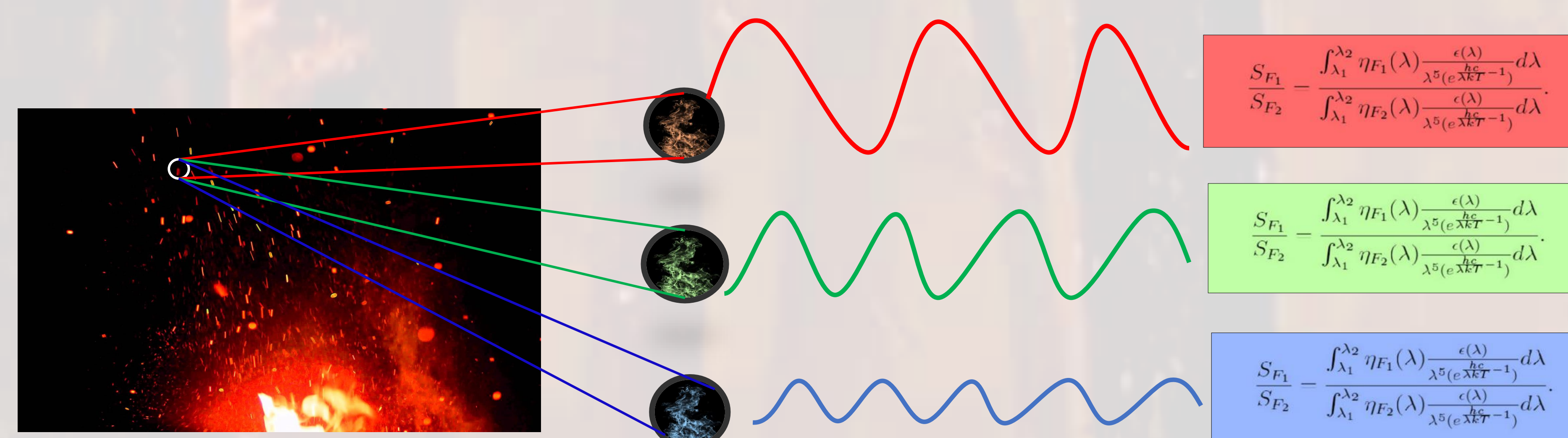
Using this non-contact technology we will be able to measure the temperature of a gray body emitting visible light. For instance, knowing the surface temperature of a firebrand can provide insight into the risk of fire-spotting in a wildfire.



Our Mission

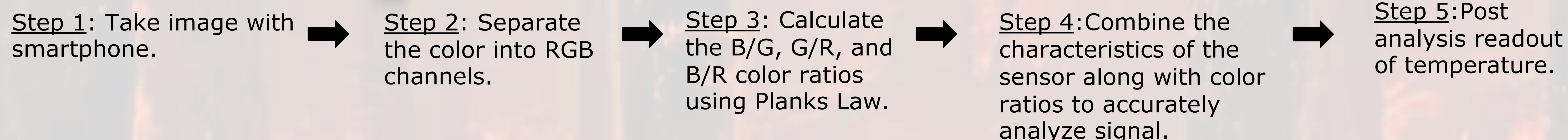
To assist firefighters by developing a tool that can provide insight into the risk posed by firebrands emanating from an uncontrolled fire.

Finding Temperature



Current Objective

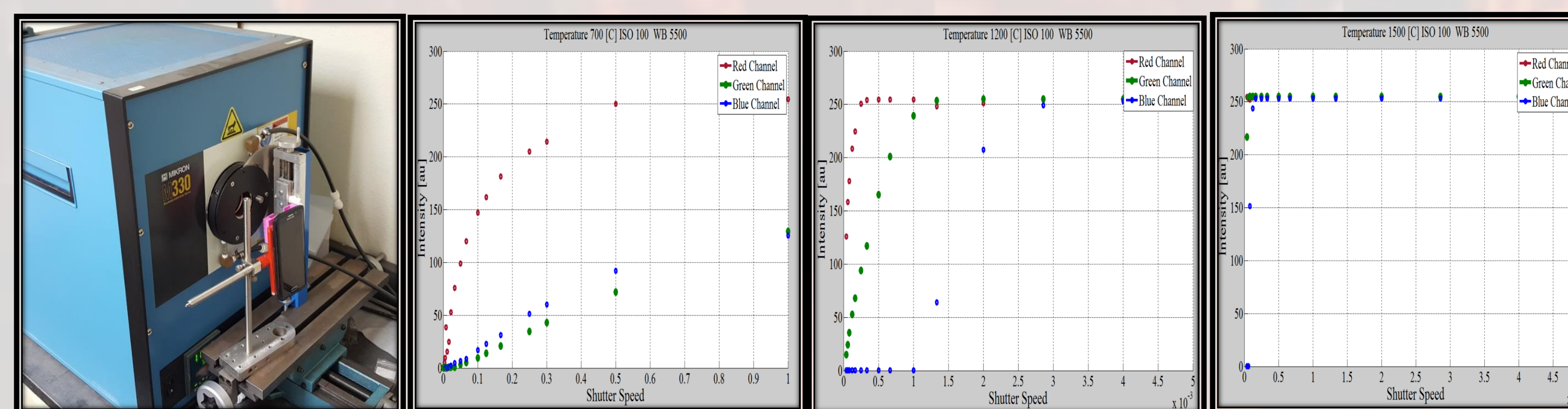
Finalizing the Characterization of the sensor by determining the sensitivity across the spectrum.



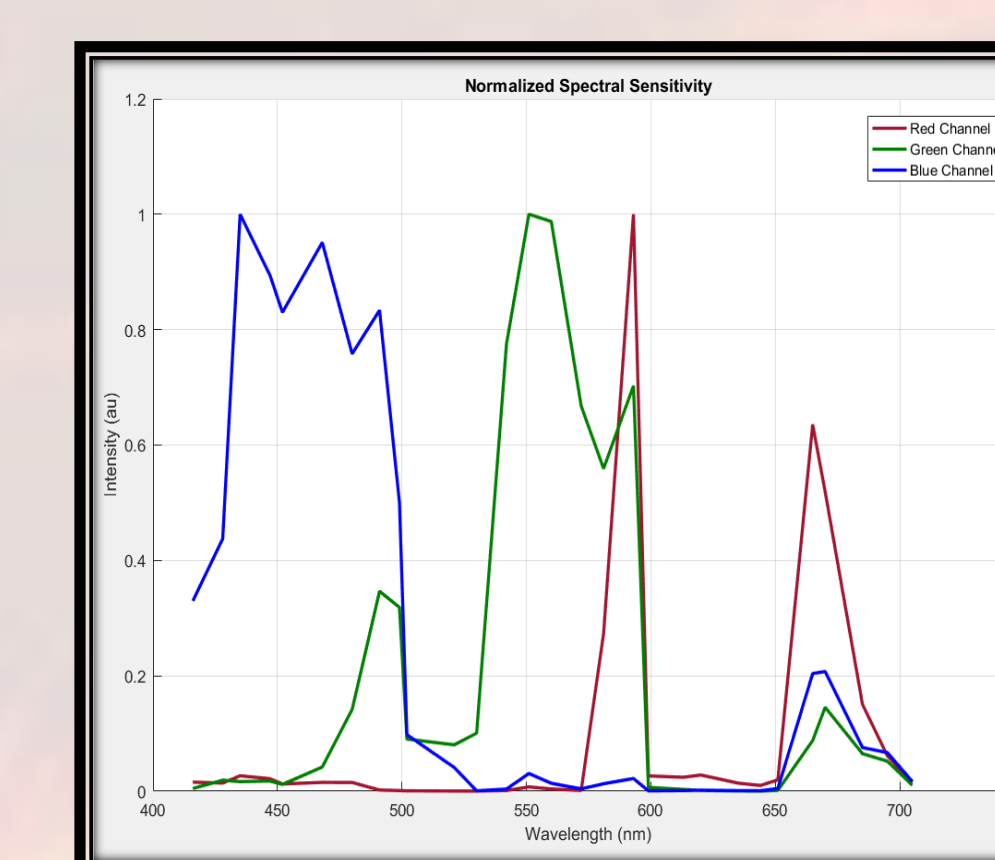
Characterizing our Camera

Outcome:

Create a theoretical look-up table of temperature values using calculated efficiencies of each channel and information found from images of a black body oven.

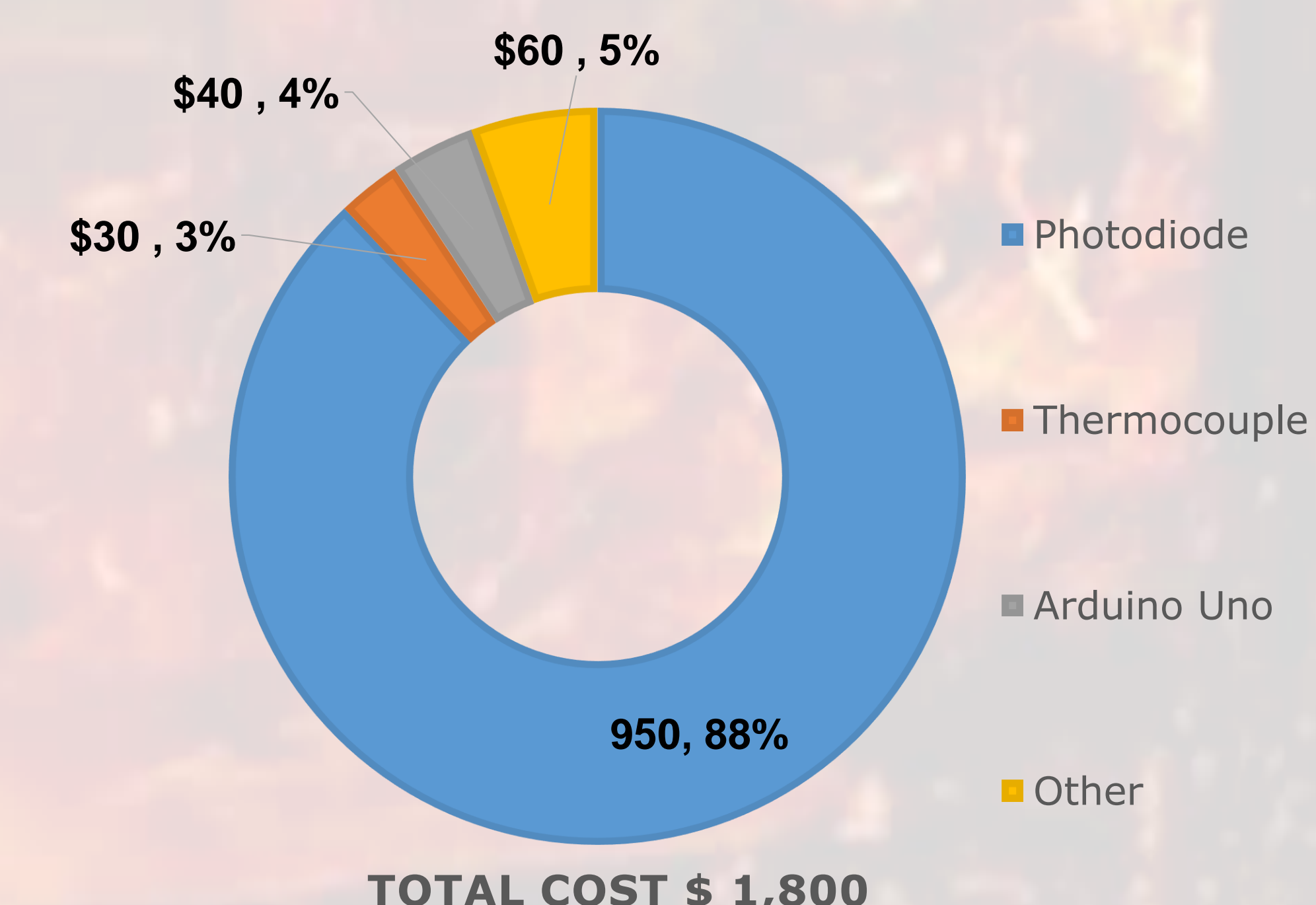


Used blackbody source to calibrate the sensor of our camera. We chose the black body as reliable source to help define the camera sensitivity. We set up the device at a constant temperature and took several images with a constant ISO and various shutter speeds.



Graph of normalized sensitivity to each wavelength. Used for temperature analysis.

Budget



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