

ECE 480

Design Team 13:

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Tunable Light Source

Sponsor:

Dr. Prem Chahal

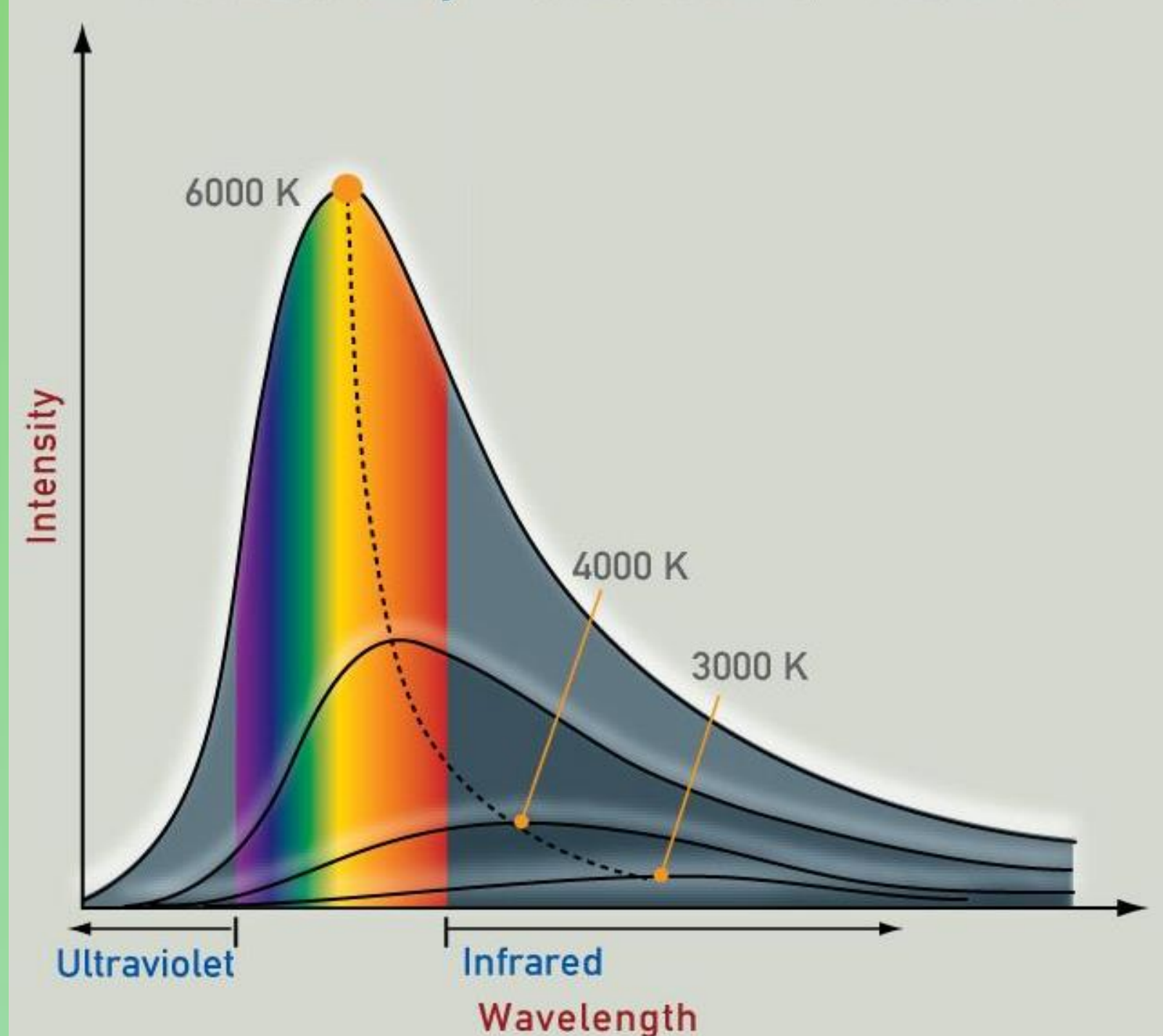
Facilitator:

Dr. Virginia Ayres

Goal

Create a device that mimics the spectral content of the sun.

Blackbody Radiation Curves



Design Parameters

- 25 peak wavelength points
- Compact & Low-Cost
- USB Controllable
- Spectral range: 400nm – 1100nm
- Power Output: 0.1 W/mm²

Abstract

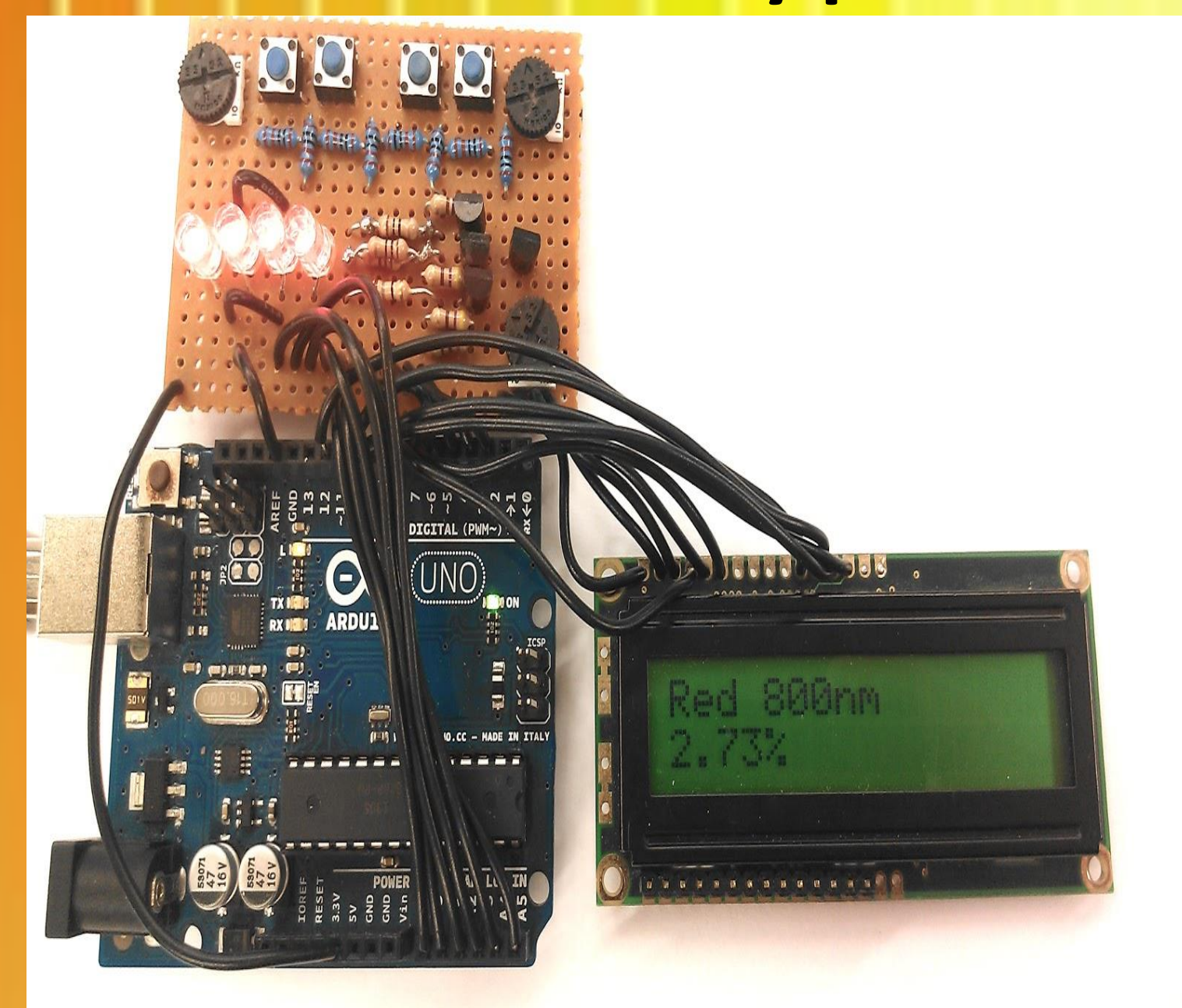
Team 13 created a user friendly testing device composed of LEDs that can be controlled via laptop. The aim is to provide at least 25-peak wavelength points over a spectral range of 400 nm to 1100 nm. This illuminates a local spot of 1 mm² on a solar cell. The solar cell is monitored using a voltmeter to determine the light-conversion efficiency. The device was requested by Dr. Prem Chahal to use in the Michigan State University Electro-Optics Laboratory. The purpose is to expose future electrical engineers to solar cell concepts. One example is the study of how light intensity and wavelength affect the voltage produced by a solar cell.

Budget

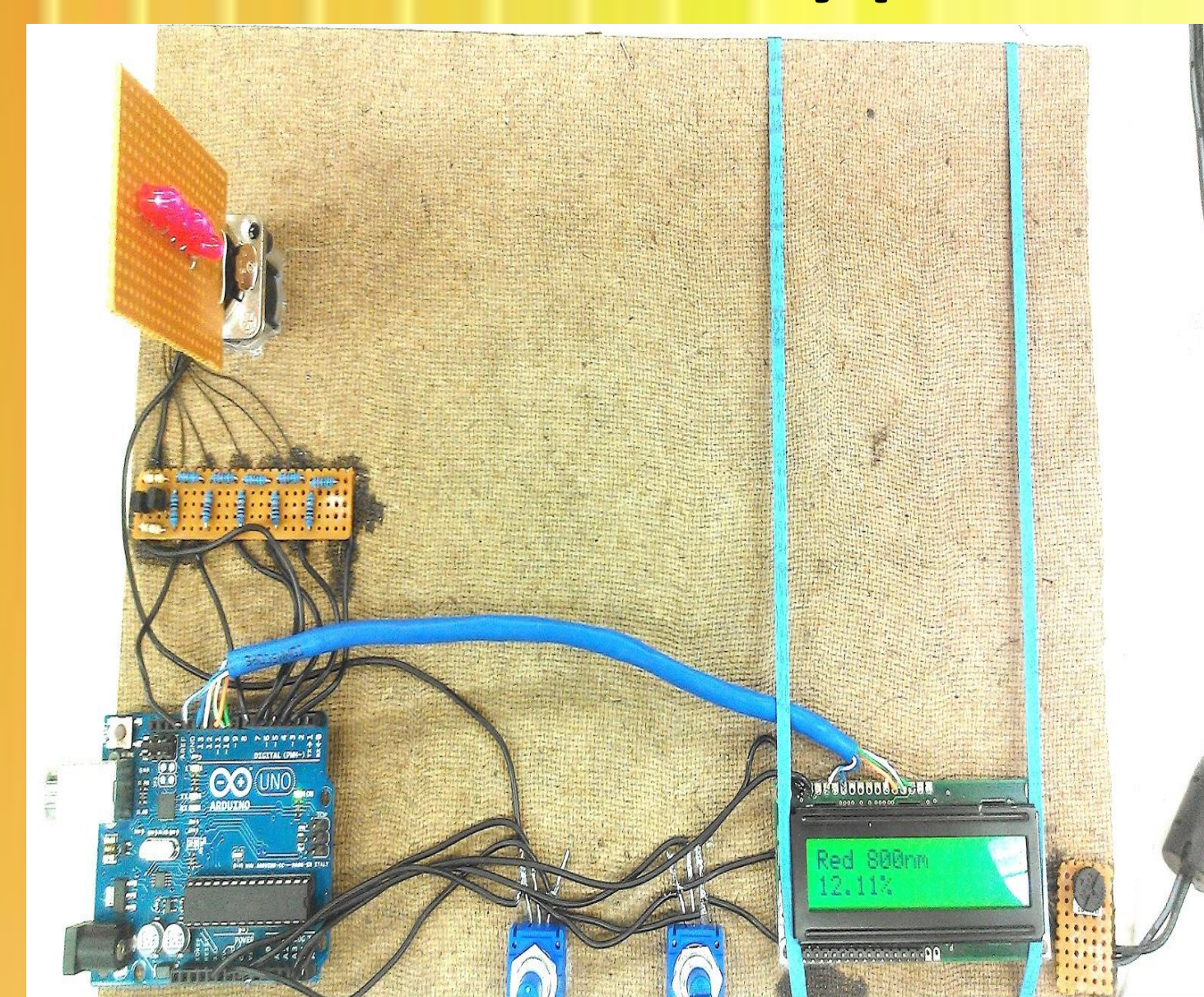
Projected Budget per Unit			
Description	Cost	Quantity	Final Cost
LEDs	\$1.82	25	\$46.29
Potentiometers	\$3	4	\$12.00
Housing	\$60	1	\$60
Battery	\$23.00	1	\$23.00
Display	\$12.79	1	\$12.79
Microcontroller	\$11.22	1	\$11.22
Total Cost=			\$165.3

Designs

1st Prototype:



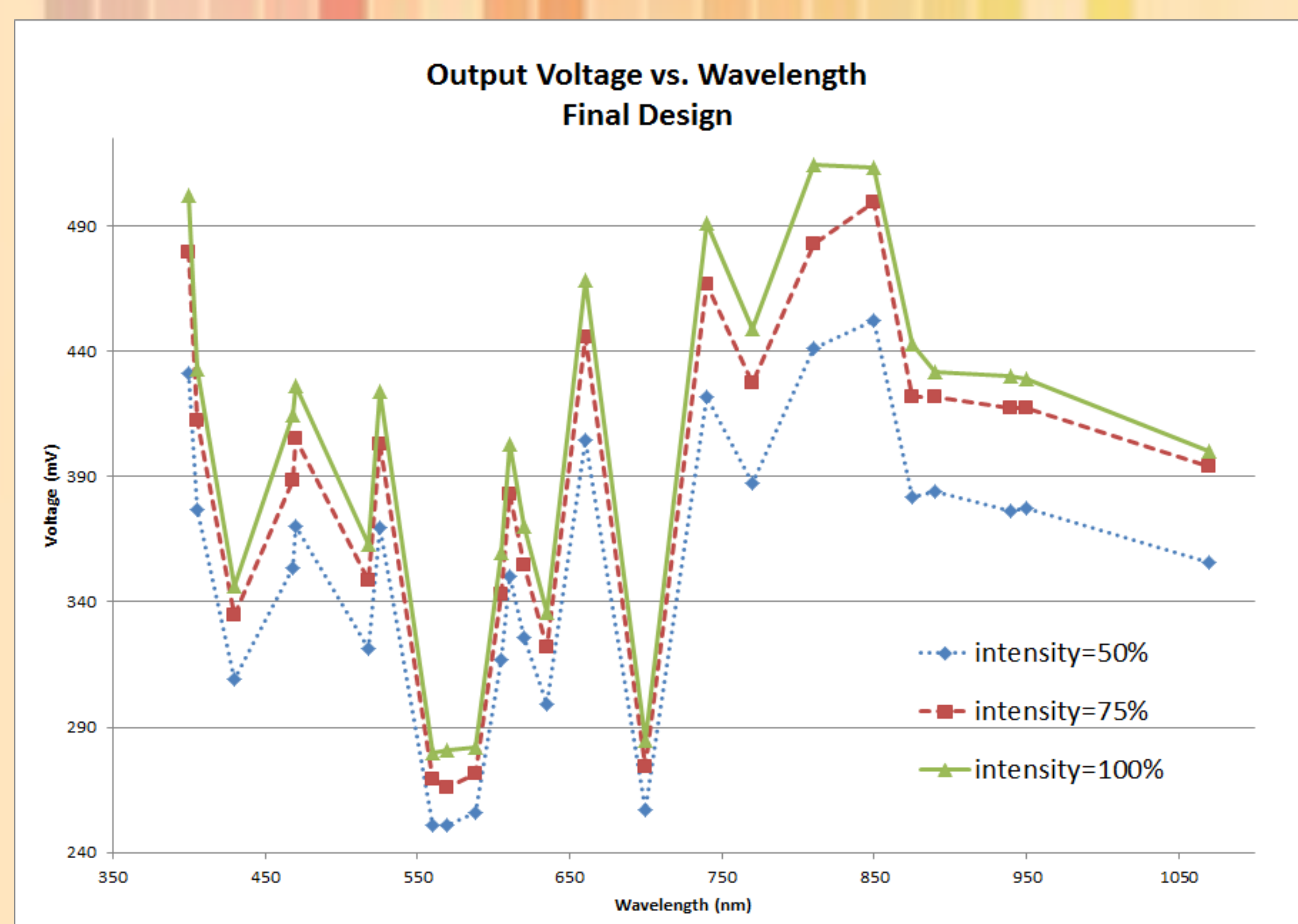
2nd Prototype:



Final Array Design



Results



MICHIGAN STATE UNIVERSITY