

## PearlPlotter Nick Maleki

An intensity of light plotter and series of equations to correct for light spectra and sensor responsivity.

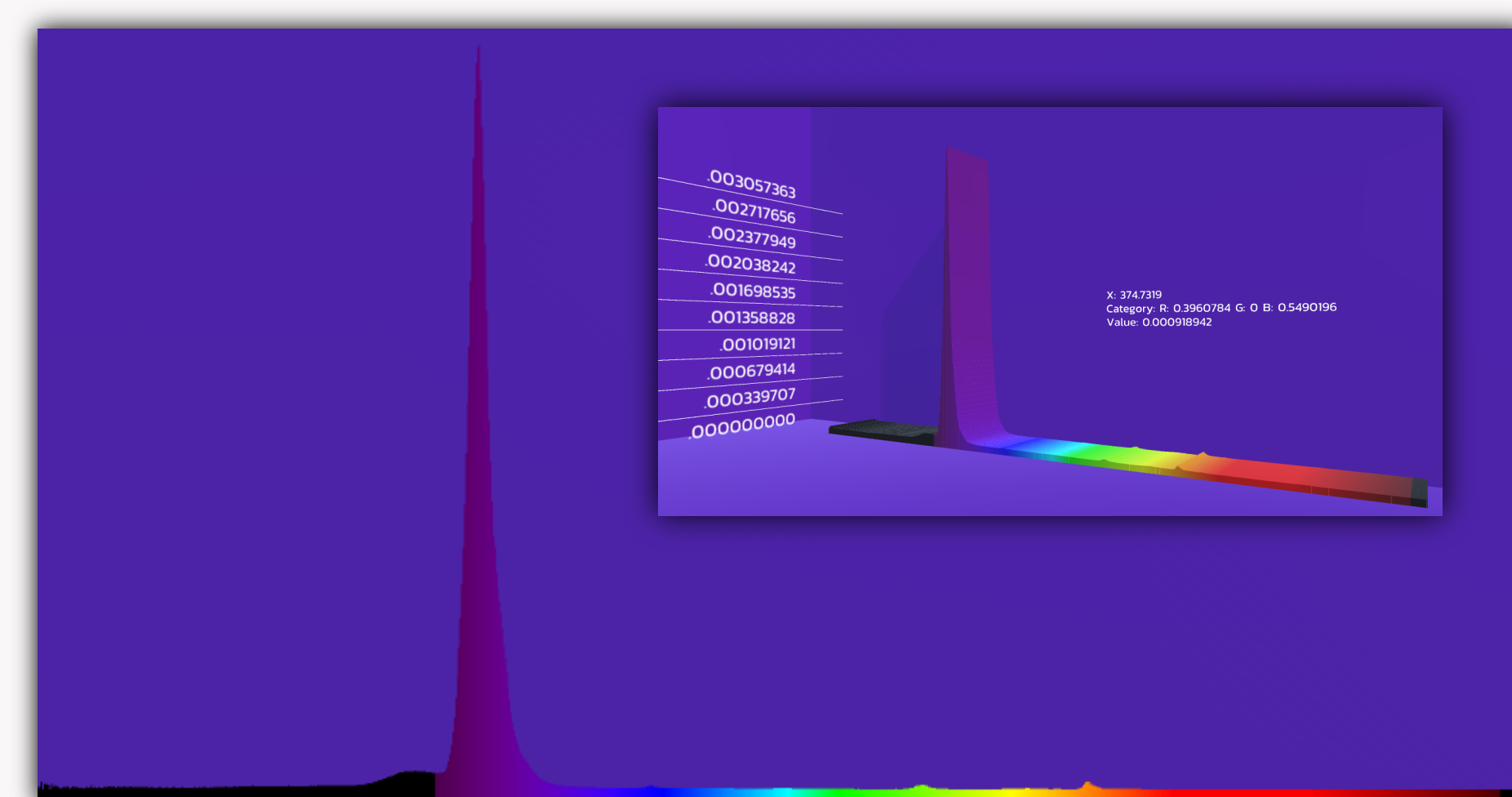
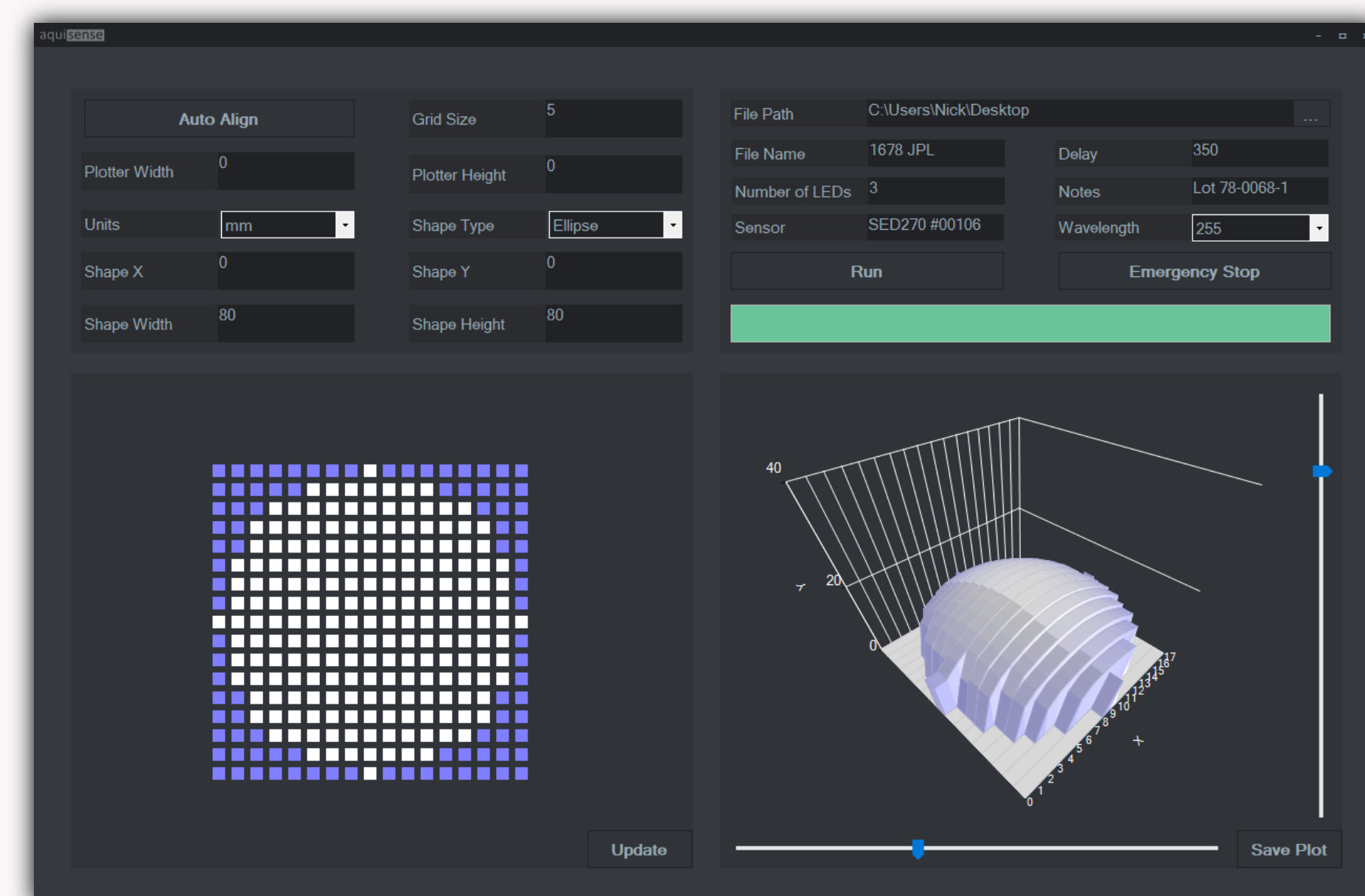
### Description

- **Hardware:** A device that holds up a light source and measures the intensity of light that is produced on a XY plane.
- **Application:** A simple interface that generates the shape the plotter will be measuring in and produces a csv file describing the intensity of light on this shape.
- **Calculator:** User can input raw sensor values, sensor calibration curves, and light spectras to create adjusted intensity plots, averages, and petri factors.

Petri Factor (Average/Max)	0.227239248
Weighted Sensor Wavelength Calibration Factor (A cm2 W-1)	1.53E-04
Wavelength Adjusted Average Intensity (μW/cm²)	20349.0

### Background

Biomedical researchers require this data for UV dosing experiments and traditional measuring methods take hours to complete and aren't nearly as accurate. The proposed method takes minutes to complete.



(mm)	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Realizing an accurate plot of light intensity on a 2D plane using an XY plotter after correcting for light spectra, sensor responsivity, and wavelength of light.



Scan for more details

(mm)	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(mm)	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(mm)	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Wavelength λ												Outcome	
Uplink data					Sensor data		Interpolated data					Sum of weighted values	
λ (nm)	Spectral flux [W nm <sup>-1</sup> ]	Measurement Bandwidth (nm)	Radiant power (W)	Radiant Power, trimmed (W)	λ (nm)	Sensor Responsivity (A cm <sup>2</sup> W <sup>-1</sup> )	Interpolation wavelength (nm)	Sensor Responsivity, interpolated (A cm <sup>2</sup> W <sup>-1</sup> )	Radiant Power, interpolated (W)	Weighted radiant power (J)			
4	1593.0	1.055E-05	0.57	8.33E-06	200	6.883E-07	215	4.78E-07	0.00E+00	0.00E+00	1.27E-05		
5	193.6	1.631E-04	0.57	9.33E-05	205	6.153E-07	216	4.81E-07	0.00E+00	0.00E+00	8.29E-05		
6	194.1	1.065E-04	0.57	6.10E-05	210	5.070E-07	217	4.84E-07	0.00E+00	0.00E+00	8.29E-05		
7	194.7	8.364E-05	0.57	4.79E-05	215	4.775E-07	218	4.88E-07	0.00E+00	0.00E+00	8.29E-05		
8	195.3	7.003E-05	0.57	4.01E-05	220	4.942E-07	219	4.91E-07	0.00E+00	0.00E+00	8.29E-05		
9	195.8	6.634E-05	0.57	3.80E-05	225	4.559E-07	220	4.94E-07	0.00E+00	0.00E+00	8.29E-05		
10	196.4	8.035E-05	0.57	4.40E-05	230	5.537E-07	221	4.87E-07	0.00E+00	0.00E+00	8.29E-05		
11	197.0	1.477E-04	0.57	4.45E-05	235	1.171E-06	222	4.78E-07	0.00E+00	0.00E+00	8.29E-05		
12	197.6	5.537E-05	0.57	3.18E-05	240	5.539E-06	223	4.71E-07	0.00E+00	0.00E+00	8.29E-05		
13	198.1	1.024E-04	0.57	1.86E-05	245	1.132E-06	224	4.64E-07	0.00E+00	0.00E+00	8.29E-05		
14	198.7	5.947E-05	0.57	3.40E-05	250	2.600E-06	225	4.58E-07	0.00E+00	0.00E+00	8.29E-05		
15	199.3	4.638E-05	0.57	2.85E-05	255	3.817E-07	226	4.76E-07	0.00E+00	0.00E+00	8.29E-05		
16	199.9	5.634E-05	0.57	1.22E-05	260	4.788E-07	227	4.98E-07	0.00E+00	0.00E+00	8.29E-05		
17	200.4	5.613E-05	0.57	3.21E-05	265	5.617E-06	228	5.14E-07	0.00E+00	0.00E+00	8.29E-05		
18	201.0	7.121E-05	0.57	4.98E-05	270	8.438E-06	229	5.34E-07	0.00E+00	0.00E+00	8.29E-05		
19	201.6	5.327E-05	0.57	3.16E-05	275	7.406E-06	230	5.56E-07	0.00E+00	0.00E+00	8.29E-05		
20	202.1	5.572E-05	0.57	3.19E-05	280	8.219E-06	231	7.13E-07	0.00E+00	0.00E+00	8.29E-05		
21	202.7	2.393E-05	0.57	9.882E-06	285	9.882E-06	232	8.21E-07	0.00E+00	0.00E+00	8.29E-05		
22	203.3	4.765E-05	0.57	2.73E-05	290	9.830E-06	233	1.04E-06	0.00E+00	0.00E+00	8.29E-05		
23	203.9	5.819E-05	0.57	3.51E-05	295	9.812E-06	234	1.21E-06	0.00E+00	0.00E+00	8.29E-05		
24	204.4	4.100E-05	0.57	2.35E-05	300	1.120E-04	235	1.37E-06	0.00E+00	0.00E+00	8.29E-05		
25	205.0	2.888E-05	0.57	1.64E-05	305	1.184E-04	236	2.22E-06	0.00E+00	0.00E+00	8.29E-05		
26	205.6	5.064E-06	0.57	2.838E-06	310	1.188E-04	237	1.60E-06	0.00E+00	0.00E+00	8.29E-05		