

# We're developing a continuous flow system that measures antioxidant capacity.

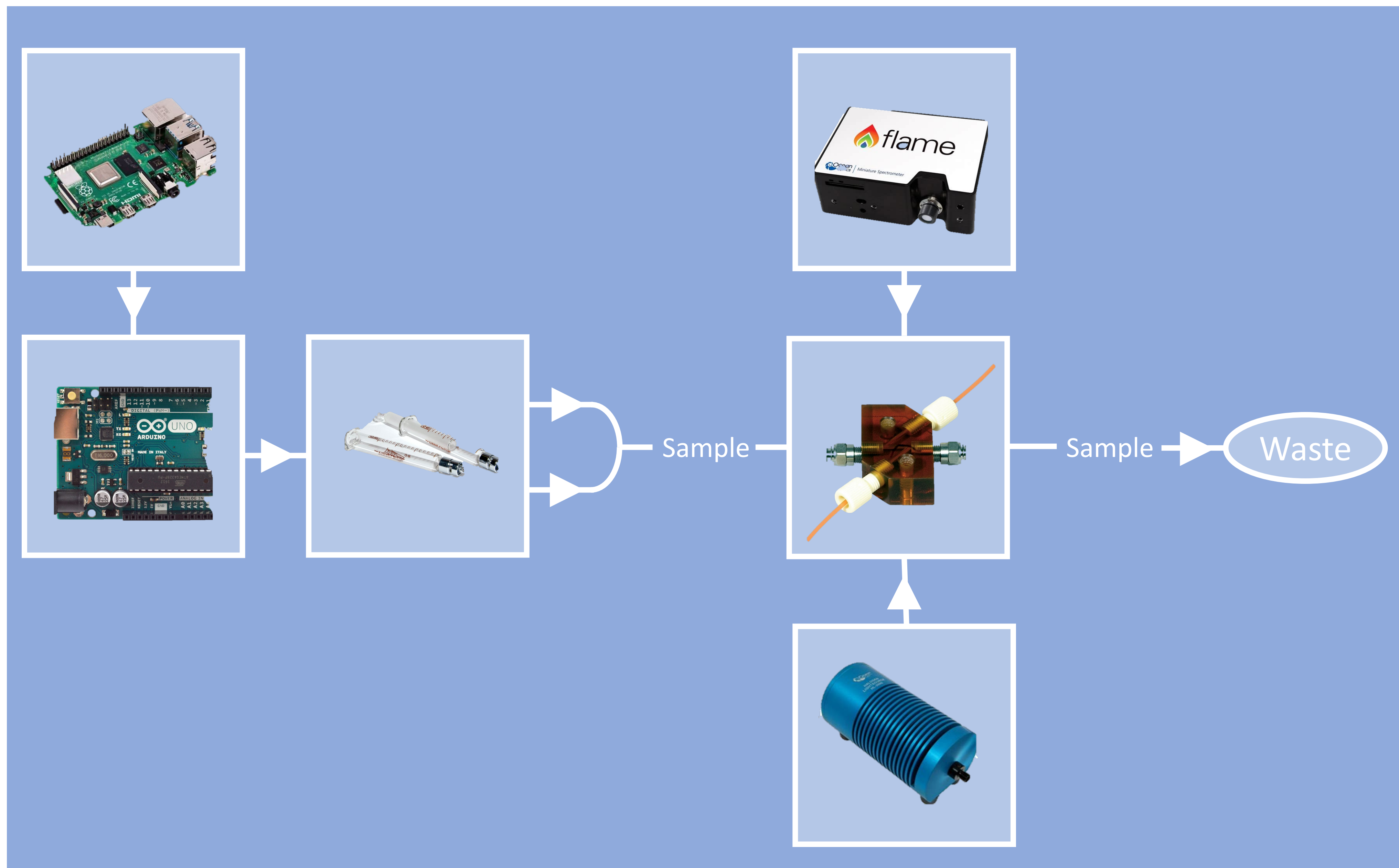


Figure 1. Block diagram of continuous flow system.

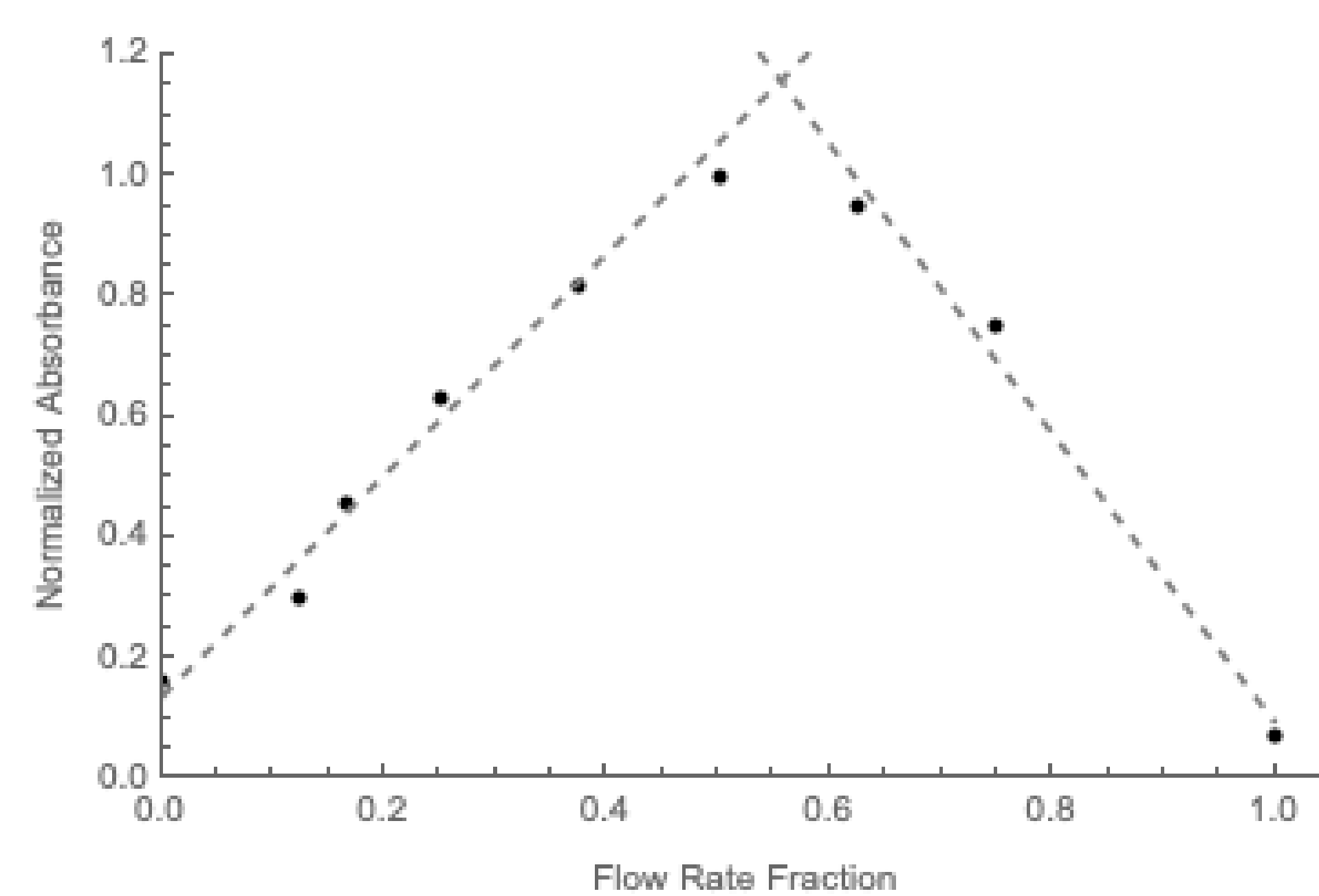


Figure 2. Normalized method of continuous variation plot created by varying flow rate fractions of 0.3 mM ferric ammonium sulfate and TPTZ solutions.

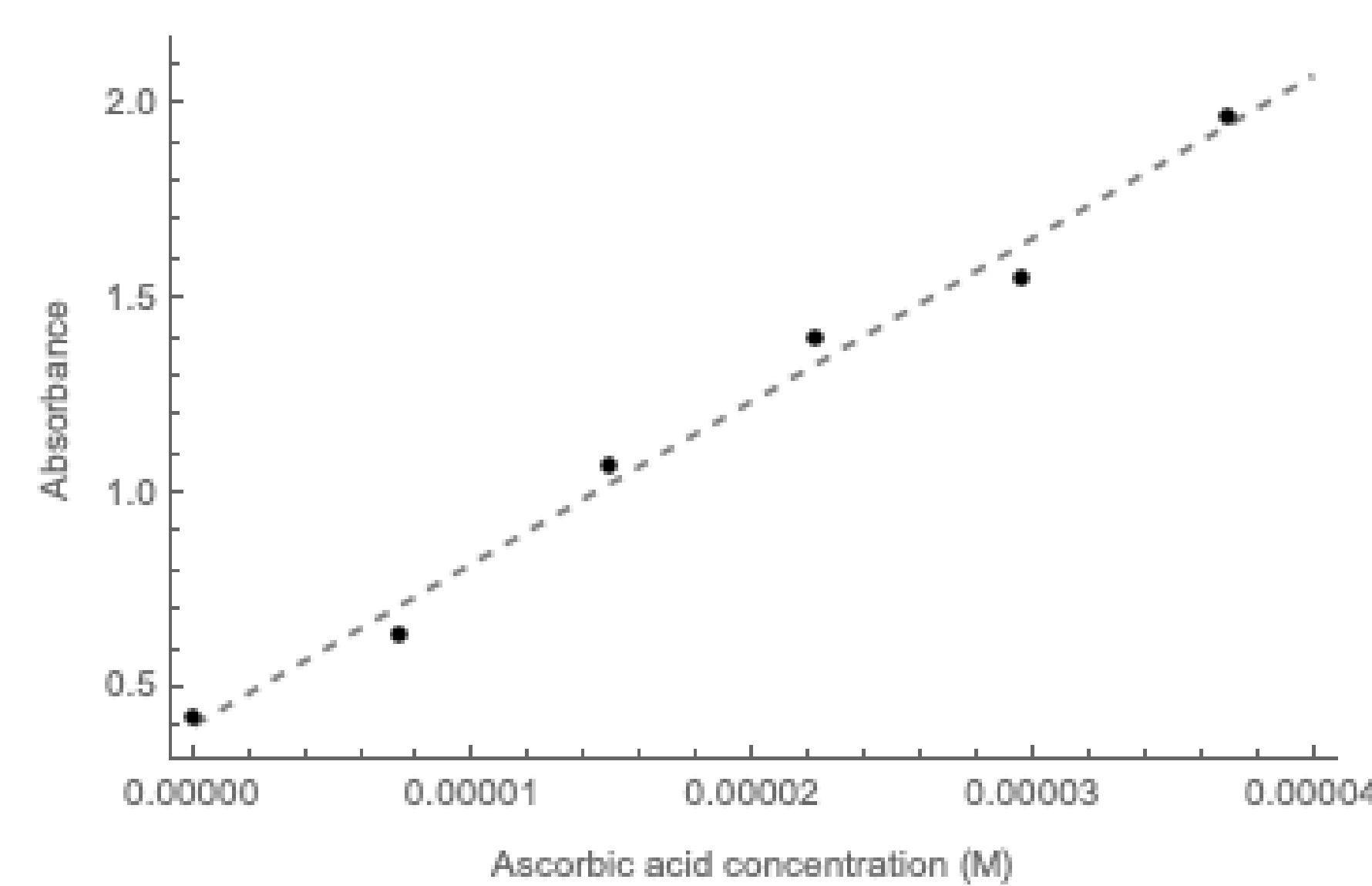


Figure 3. Calibration curve for a set of FRAP samples using flow system ( $R^2 = 0.986$ ).

## Conclusion

- Some questions left to answer, such as possible influences from reaction time
- More work to do on method of continuous variation

## Development of a Continuous Flow System for Total Antioxidant Capacity Analysis

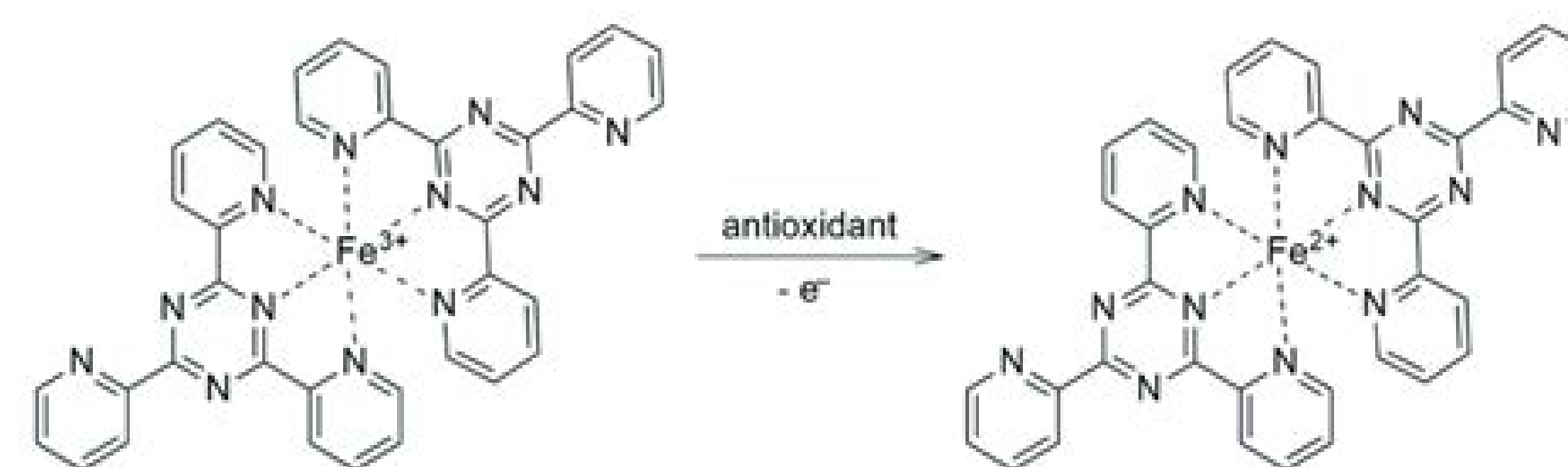
Hannah Schuler and Dr. Robert LeSuer, Department of Chemistry, SUNY Brockport

### Introduction

- Antioxidants, such as uric acid and vitamins A, C, and E, inhibit oxidation, a process that damages cells.
- Antioxidant capacity is a measure of ability to inhibit oxidation.
- My objective was to develop a small scale, flexible, reproducible system that can measure antioxidant capacity.

### Methods

- FRAP reagent consisted of TPTZ, ferric chloride, and an acetic acid buffer solution. FRAP samples consisted of FRAP reagent, ascorbic acid, and water



- Calibration curves were obtained by varying ascorbic acid concentration between 0 and  $5.7 \times 10^{-5}$  M.
- Method of continuous variation plots were obtained by varying flow rates were varied between 0 and 240  $\mu\text{L}/\text{min}$

### Results

- Troubleshooted various aspects of the flow system, including technical issues (bubbles, fluid volume delivery) and chemical issues (replaced ligand in FRAP, sample preparation)
- Obtained calibration curve for FRAP samples ( $R^2 = 0.98$ )
- Successfully used method of continuous variation without antioxidant

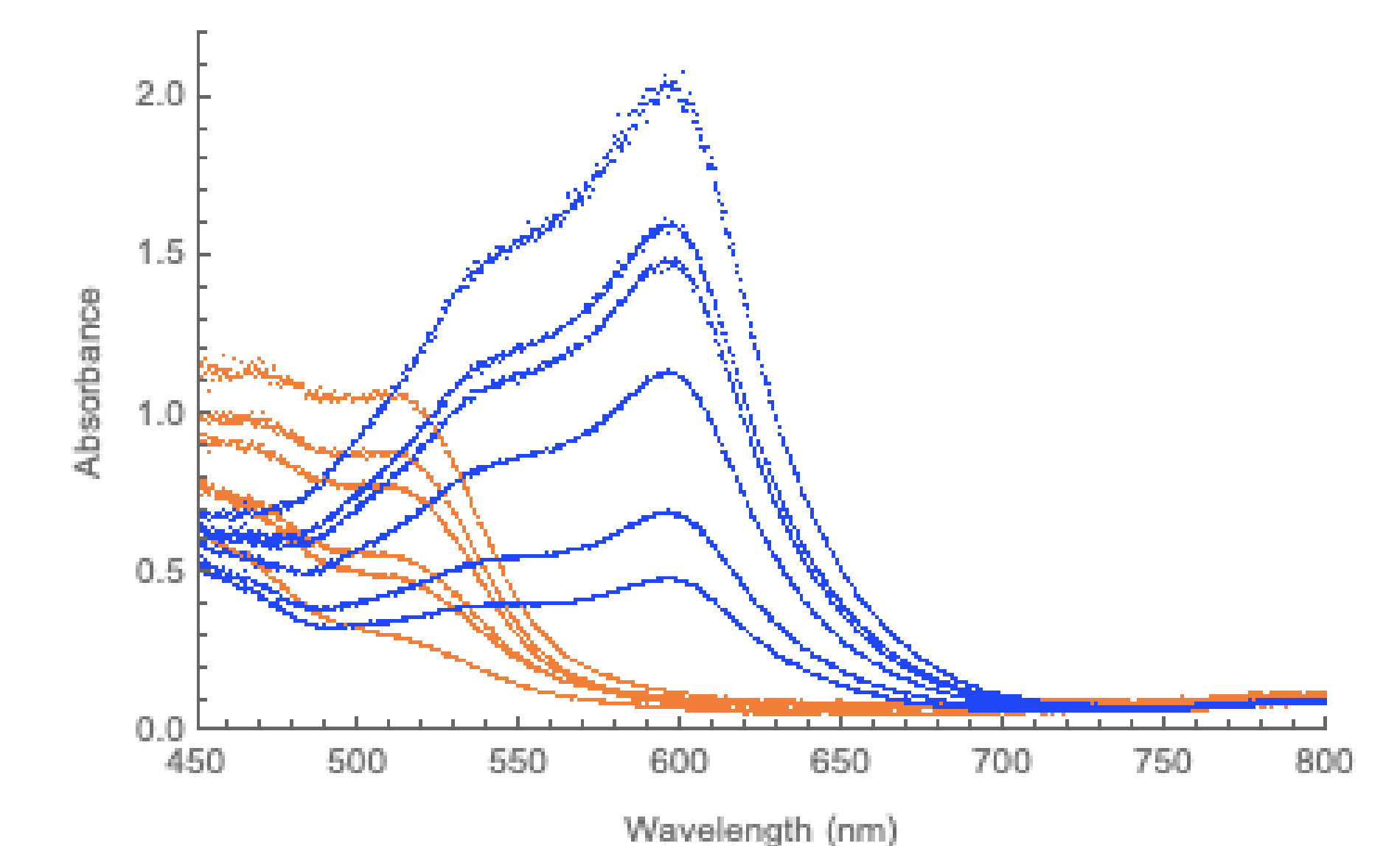


Figure 4. Absorbance spectra for phen-FRAP (orange) and TPTZ-FRAP (blue).



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