



# Matthew Miyada

*EXPAND Mentor*

## Development of Activity-Based Fluorescent Probes to Target Biosynthetic Enzymes

Prof. Michael D. Burkart/Burkart Lab (2022-2023)

### What you will do

Much of the world's biodiversity stems from the wide range of chemical compounds produced by life. These molecules, known as natural products, are synthesized through a strictly governed series of enzymatically catalyzed biochemical reactions. Our research group explores the biosynthesis of natural products by using molecular tools to probe and modify proteins involved in these complex metabolic pathways. In particular, fluorescence has been established as a utile and convenient means of visualizing protein-substrate interactions. **This project will focus on the development of fluorescent probes to investigate key enzymes involved in biosynthetic pathways.** Over the course of ten weeks, you will research the properties of a fluorescent molecule which changes color based on its immediate molecular environment. You will discover how the unique properties of this molecule can be harnessed to monitor the activity of biosynthetic enzymes. You will also have the opportunity to learn and perform the organic synthetic methods used to make the fluorescent probe. Overall, this project integrates an array of chemical and biological methods to provide you with a strong set of research skills and a foundational understanding of biochemistry.

### Skills you will acquire

- Molecular-based understanding of natural product biosynthesis
- Introduction to organic synthetic techniques, including purification and structure elucidation
- Introduction to protein biochemical techniques, including expression and purification
- Handling of common biochemical/chemical laboratory instruments
- Ability to analyze experimental data and create figures
- Familiarity with applications of fluorescence in chemical biology