Mackenzie Fahey

1161 East Carnaby Street
Bloomington, IN 47401
Telephone: (586) 863-7967
Homepage/Portfolio: mmfahey.com
Email: mmfahey@indiana.edu

ABOUT ME

Self-taught programmer, currently a senior graduate student in inorganic chemistry. After working on research related and personal programming projects, I realized that I wanted to take my problem solving and data analysis skills learned in graduate school and apply them to computer science and software development ventures. Over the last three years I have been building up my programming skills and portfolio to transition into a development career. I mainly program in Python and have worked on projects ranging from data analysis of COVID-19 spread to building my personal portfolio site in Flask, but I am not restricted to Python and can learn new languages and frameworks quickly.

EDUCATION

- Bachelor of Science in Biochemistry, Western Michigan University, Kalamazoo, MI
  Minor in Biological Sciences
  GPA: 3.58/4.00
- PhD Candidate in Inorganic Chemistry, Indiana University, Bloomington, IN
  Minor in Materials Chemistry
  GPA: 3.67/4.00

HONORS AND AWARDS

- ACS Analytical Award, Western Michigan University, 2013-2014
- Adli Kana'an Physical Chemistry Award, Western Michigan University, 2014-2015

COMPUTER AND LANGUAGE SKILLS

- **Programming Languages:** Python, HTML, CSS
- **Technical Software:** MATLAB, Maple, LabView, GitHub and source control
- **Databases:** MySQL, SQLAlchemy, SQLite, PostgreSQL

PROGRAMMING EXPERIENCE (full portfolio/details can be found [mmfahey.com)](mmfahey.com)

LED Photoreactors Controlled via Raspberry Pi

Raspberry Pi 4, Python3 with tkinter, RPi.GPIO, time, datetime, threading

- Python-based GUI for controlling a relay board powered by a Raspberry Pi microcomputer. In the original use case, each relay is connected to a 10 W LED allowing for an array of LED photoreactors that can be powered for a set time.
- https://github.com/mmfahey/RelayControl

COVID-19 Data Analysis and Tweetbot

Python3 with datetime, pathlib, pandas, matplotlib, os, and tweepy

- Automated data scrapping and analysis of new cases and deaths from COVID-19. The data is obtained from John Hopkins automatically via Linux crontab on a Raspberry Pi and the tweetbot would tweet out daily plots and data tables.
- https://github.com/mmfahey/COVtweeter
- https://twitter.com/COV19DataTweet - No longer updated but demonstrates outcomes.

Energy Conversion Android App

Python3 with Kivy and buildozer

- Android APK written in python/kivy that allows scientists to quickly and easily convert common energy units used.
- https://github.com/mmfahey/EConverter_KivyAndroid

Personal Portfolio Page

Python3 with Flask and SQLAlchemy, HTML, CSS

- My personal portfolio website was coded from scratch by myself. The database management for uploading blogs and portfolio posts is handled by SQLAlchemy. All the HTML and CSS was done by me as well.

RESEARCH EXPERIENCE

Research Intern   **May 2014 – September 2014**

Michigan State University Bioeconomy Institute, Holland, MI; Advisor: Dr. Thomas Guarr

- Synthesized cobalt phthalocyanine derivatives for the reduction of oxygen.
- Incorporated synthesized oxygen reduction catalysts into microbial fuel cells.

Undergraduate Research Assistant   **October 2014 – May 2015**

Department of Chemistry, Western Michigan University, MI; Advisor: Dr. Sherine Obare.

- Synthesized ruthenium based molecular sensors for the detection of toxic organic pollutants.
- Developed sensors with dual modes of signal transduction for the detection of pesticides at the picomolar range.

Graduate Research Assistant   **June 2015 – Present**

Department of Chemistry, Indiana University, IN; Advisor: Dr. Jeffrey Zaleski.

- Designed and synthesized a variety of transition metal nanoparticles with optical properties suited for catalytic remediation of environmentally harmful small molecules and destruction of disease-causing biopolymers.
- Developed and utilized methodologies in static and time-resolved spectroscopy to generate mechanistic conclusions about catalytic homogeneous and heterogeneous processes.
- Programmed custom software to operate home-built LED photo-reactors and custom spectrometers.

ORAL PRESENTATIONS

- Fahey, M.; Guarr, T. *Poly-Cobalt(II) Tetraaminophthalocyanine as an Oxygen Reduction Catalyst in Microbial Fuel Cells.* Hope College Summer Research Symposium. August 18, 2014.
- Fahey, M.; Zaleski, J. *Utilizing Plasmonic Nanomaterials and Time-Resolved Spectroscopies to Develop Mechanistic Interpretations of Catalyzed Reactions.* Fifth Semester Seminar. December 6, 2017.

TEACHING EXPERIENCE

Teaching Assistant. Chemistry Department, Western Michigan University

CHEM1130 - General Chemistry II Laboratory

- Worked as a laboratory teaching assistant as a senior undergraduate student. Provided students with adequate safety precautions and lab techniques to successfully synthesize compounds and correctly identify their products through a variety of spectroscopic techniques. Other duties included grading weekly homework, quizzes, etc. and holding weekly office hours to help students.

Supplemental Instructor, Chemistry Department, Western Michigan University

CHEM1120 - General Chemistry II

- Worked as a supplemental instructor as a senior undergraduate student. Held weekly lectures to go over key concepts and challenging problems to ensure students understood the course material.

Associate Instructor, Chemistry Department, Indiana University

N331 - Intermediate Inorganic Chemistry

N337 - Intermediate Inorganic Chemistry Laboratory

C432 - Spectroscopic Methods in Inorganic Chemistry

C437 - Inorganic Chemistry Laboratory

C502 - Inorganic Spectroscopy (Graduate)

- Laboratory classes required providing students with adequate safety precautions and lab technique to successfully synthesize inorganic compounds and correctly identify their products through a variety of spectroscopic techniques.
- Discussion classes required helping students with homework, quiz, and exam questions or ideas. Also allowed students to re-examine in-class topics they do not understand.
- Both teaching opportunities can with additional duties, i.e grading weekly homework, quizzes, etc. and holding weekly office hours to help students.