

SEMI208

Education

University of Oregon, Eugene, OR

Anticipated Graduation: Fall 2018

Master of Science, Chemistry with a focus in Semiconductors and Photovoltaics

University of Kentucky, Lexington, KY

Graduation: May 2017

Bachelor of Science, Double Major in Chemistry and Classics

Cumulative GPA: 3.80

Work Experience

Undergraduate Research Assistant

University of Kentucky, Kenneth Graham Research Group

August 2016-May 2017

Project 1: Observing Effects of Ion Exchanged Compounds in Dye-Sensitized Organic Photovoltaics (OPVs)

- Improved stability of OPVs via ion exchange in active layer near-IR dyes, increasing working lifetime by 65-80%.
- Performed ion exchange reactions in an oxygen-free environment that required purification of dyes via thin-layer chromatography, silica column separation, extraction, recrystallization, and concentration via rotary evaporation.
- Operated microscale solar cell fabrication equipment such as an argon/nitrogen glovebox, metal deposition chamber, and spincoater.
- Characterized performance and material properties of solar cells using Keithley 2400 SourceMeter in conjunction with a solar simulator, as well as UV-Vis spectrometer for band gap analysis.

Project 2: Measuring Effects on Quantum Yield of Surface-Modified Methylammonium Lead Iodide Perovskite Thin Films

- Improved quantum yield of perovskite thin films by up to 1244% using a variety of surface modifier compounds.
- Built the lab's first measurement apparatus for measuring relative irradiance, incorporating a 532 nm laser, 550 nm filter, and integrating sphere.
- Trained four PhD students and wrote SOP on surface modification and quantum yield data measurement procedure.
- Standardized measurement apparatus by preparing samples of standard dyes of known quantum yield in both solution and solid state in order to construct a calibration curve.
- Presented research to students and faculty at a state-wide undergraduate poster session.

Undergraduate Learning Assistant (General Chemistry Laboratory)

University of Kentucky

January-May 2017

- Instructed a section of 20-24 students through the General Chemistry Laboratory curriculum.
- Composed and presented conceptual and technical instruction to students in the form of pre-lab lectures and continued to advise students during lab on proper technique and safety protocol.
- Overcame difficulties arising from holding the class in a new building for the first time, requiring unforeseen adaptation of procedures to new environment and proposing changes to the lab manual accordingly.

Asphalt Binder Technician

Asphalt Institute

May-August 2016

- Followed standard operating procedures according to American Society for Testing Performed standards in preparing and testing asphalt binder samples.
- Learned to operate an array of testing equipment independently within one week, such as the dynamic shear rheometer, flash point tester, ductility bath, viscosity tester, rotational viscometer and rheometer, and softening point apparatus, as well as any associated software.
- Strengthened time management and teamwork skills working with two senior technicians by delegating tasks among each other at the start of every day, preparing equipment for team members, and submitting test data to fulfill daily deadlines.

ChemExcel Secondary Instructor

University of Kentucky

August-December 2015

- Led a section of 5-10 students for weekly General Chemistry problem solving workshops.
- Ensured efficient use of class time by creating detailed answer keys weekly, allowing students to study challenging problems further.
- Fostered effective study habits by working one-on-one with students to prepare personalized study tools in ample time before exams.
- Modified problem sets to accurately reflect lecture material by communicating with instructors about any deviations from their syllabus.

In-Class Projects

Instrumental Analysis Laboratory, Group Final Project

University of Kentucky, 2016

- Determined caffeine, vitamin B6, and glucose content in various energy drinks via HPLC and glucometry.
- Followed proper analytical procedure by constructing a calibration curve from a set of standards.
- Quantified limitations of analysis method by comparing results to nutritional labels and identifying compounds in ingredients that were overlapping with signals of targeted compounds.

Qualitative Organic Analysis Laboratory, Semester-Long Synthesis Project

University of Kentucky, 2017

- Synthesized three acene compounds using techniques such as using a nitrogen reaction environment, thin layer chromatography, dry-packed silica column purification, and recrystallization.
- Confirmed presence of desired product via ^1H NMR, ^{13}C NMR, and FT-IR spectroscopy.
- Characterized band gap changes due to varied functionalization via UV-Vis and fluorescence spectroscopy.
- Verified improvements to crystal packing structure resulting from varied substituents by analyzing X-ray diffraction data.

Other Experience

- Served as Parliamentarian for a student-run Latin society, the Kentucky Junior Classical League from 2012-2013
 - Improved candidate turnout for next year's elections by amending the chapter's Constitution.
 - Reached out to Latin students state-wide for candidate recruitment and training for officer elections.
 - Managed annual officer election during state convention, ensuring all candidates were prepared and that the process was conducted fairly.
- Served as President of the Louisville Classical Academy chapter of the Junior Classical League from 2011-2012; established the chapter's written bylaws and election procedures.
- Translated the entirety of Xenophon's *Anabasis* from Ancient Greek over the course of a semester and a summer.

Awards

- Patterson Scholarship and Corporate-sponsored Merit Scholarship, 2013-2017
 - Four-year full tuition scholarship awarded to National Merit Finalists, recognizing high achievement on the PSAT and National Merit Competition out of 1.5 million participants.
- Notable Undergraduate in Classics award, University of Kentucky 2014
- University of Kentucky Chemistry Department honors, 2017