Samuel J. Dawley

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Education

Johns Hopkins University BACHELOR OF ARTS, CHEMISTRY *Baltimore, MD · Spring 2023 (expected)*
  Focus on Organic Chemistry
  Advised by Prof. John Dayton Tovar

Johns Hopkins University BACHELOR OF ARTS, APPLIED MATHEMATICS & STATISTICS *Baltimore, MD · Spring 2023 (expected)*
  Focus on Statistics and Statistical Learning
  Advised by Prof. Yanxun Xu

Research Experience

Research Intern, Platform for the Accelerated Realization, Analysis, and Discovery of Interface Materials *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY *Summer 2022 - Present*

- Advanced strategies for real-time data analysis toward achieving autonomous experimental control.
- Used statistical analysis and machine learning to develop an algorithm and programmatic implementation for automatic signal structure and spectral peak detection.
- Gained experience in inorganic synthesis and characterization using X-ray diffraction.
- Implemented methods for live streaming experimental data using Apache Kafka.

Undergraduate Research Assistant, Cheng Lab *Baltimore, MD*

DEPARTMENT OF CHEMISTRY, JOHNS HOPKINS UNIVERSITY *Spring 2022 - Present*

- Researched relativistic effects in light- and heavy-atom molecules using high-level computational and theoretical methods aimed at quantitative descriptions of quantum systems.
- Used coupled-cluster theory to calculate polarizability tensors of molecular and heavy-element ionic diatoms.
- Presented benchmark calculations and assessed relative efficacy of perturbative and variational treatments of spin-orbit coupling in heavy-element molecules.
- Collaborated with experimentalists to corroborate results at ultracold temperatures.

Research Intern, Medoff Lab *Boston, MA*

MASSACHUSETTS GENERAL HOSPITAL *Summer 2021*

- Studied response of airway epithelium cells to lung inflammation and scarring for an increased understanding of idiopathic pulmonary fibrosis.
- Created, maintained, and monitored tissue cocultures grown from basal and immune cells of a murine sample.
- Developed algorithm to parse the spatial distribution of cultured cells using a Delaunay triangulation and visualize the inflammation patterning.

Undergraduate Research Assistant, Tovar Lab *Baltimore, MD*

DEPARTMENT OF CHEMISTRY, JOHNS HOPKINS UNIVERSITY *Winter 2020 - Present*

- Studied non-planar, hybrid radial and linear aromatic systems containing cycloparaphenylenes and their derivatives.
- Synthesized novel organic compounds for cycloparaphenylene modeling and characterized materials using NMR and mass spectrometry.
- Computed optimized geometries and molecular orbital energies of cycloparaphenylenes with density functional theory using high-power computing clusters.
- Configured Python package to work with advanced computing clusters and updated for running with Gaussian16 to calculate nucleus independent chemical shifts of borepin derivatives.
- Developed program to automate optimized geometry calculations in Gaussian with the Maryland Advanced Research and Computing Center.

Teaching

Teaching Assistant *Baltimore, MD*

DEPARTMENT OF CHEMISTRY, JOHNS HOPKINS UNIVERSITY *Spring 2022 - Present*

- Aided teaching introductory and intermediate organic chemistry laboratory courses.
- Taught rudimentary techniques in organic chemistry synthesis and characterization.
- Facilitated and instructed data processing and analysis across a diverse range of analytical methods.
- Responsible for proper preparation and disposal of reagents within all experiments.
- Graded lab reports and exams.

Personal Tutor   *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY   *Fall 2020 - Present*

- Volunteered with fourth-graders in Baltimore public elementary schools for individualized tutoring in math, reading, and writing through the Tutorial Project as a part of the Center for Social Concern; worked collaboratively with parents of tutees to ensure personalized aid.
- Worked with undergraduate students in one-on-one tutoring sessions for courses regarding Linear Algebra, Multivariate Calculus, Organic Chemistry, and Introductory Data Science.

Head PILOT Leader   *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY   *Fall 2020 - Present*

- Provided academic support to students in peer-led tutoring sessions within numerous classes, including Multivariate Calculus and Organic Chemistry.
- Responsible for creating problem sets and answer keys each week for all tutoring sessions within the course.
- Organized and instructed meetings to familiarize other tutors with material of course every week of the semester.
- Coordinated with course instructor to plan and facilitate review sessions current with course material to prepare students for midterm and final exams.

Volunteering

Best Buddies Foundation   *Various · Spring 2019 - Present*

- Volunteered with people with intellectual and developmental disabilities in a variety of community events.
- Raised money for organization through events including fundraising auctions, road races, and bike rides.

Pine Street Inn Homeless Shelter   *Boston, MA · Fall 2018 - Spring 2019*

- Prepared and served breakfast for people experiencing homelessness in the city.
- Cleaned dining area and silverware prior to and following meal.
- Responsible for coordinating transport of team of student volunteers to and from the homeless shelter before school.

Exceptional Citizens' Week at Camp Fatima   *Gilmanton Iron Works, NH · Summer 2015 - Present*

- Volunteered at week-long camp for people with intellectual and developmental disabilities.
- Worked one-on-one with person with disability and provided individualized support for sleeping, eating, bathing, and playing around the camp.
- Member of team which organized and served meals for entire camp and prepared camp grounds for activities including arts and crafts, fairs, parades, and theater productions.
- Raised money for Camp during other parts of the year through community events and outreach.

Extracurricular Activities

Chemistry Student Safety Committee   *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY   *Fall 2021 - Present*

- Addressed safety hazards across departmental facilities and individual labs.
- Attended trainings for development of proper scientific lab safety, management, and conduct.

First-Year Mentor   *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY   *Summer 2020 - Spring 2021*

- Supported incoming Hopkins students with year-round peer-to-peer support to ensure successful transition between high school and college; responsible for orienting and mentoring a cohort of new students during their first year.
- Trained to provide guidance and support around range of topics including academic support, student clubs and organizations, and campus resources.
- Incited discussion about inclusivity, diversity, and maintaining proper mental health in school while fostering personal relationships between students.

Best Buddies Club   *Baltimore, MD*

JOHNS HOPKINS UNIVERSITY   *Fall 2019 - Present*

- Traveled to and spent time with students at Claremont School in Baltimore which specializes in providing educational services to students with moderate to profound intellectual and developmental disabilities; involved in transporting the team of student volunteers each week.
- Promoted friendships among Claremont and Hopkins students through activities including sports, arts and crafts, and gardening.

Awards & Honors

Life Design Lab Grant Recipient, Funded to pursue research at the Massachusetts General Hospital studying idiopathic pulmonary fibrosis.
Johns Hopkins University · Spring 2021

Dean's List, Awarded to students for academic excellence.
Johns Hopkins University · All Semesters

Lonergan Award, Award given to the two graduating seniors who best exemplify altruism, character, dignity, integrity, and loyalty; the most prestigious award given by the school.
Dover-Sherborn High School · Spring 2019

Presentations

1. **Sam Dawley**, David Elbert, Tyrel McQueen, and Apurva Mehta. "Streaming by Design for Materials Characterization." Presented at: Cornell University. 2022 Aug 10; Ithaca, NY.

Skills & Tools

Experienced   Git, LaTeX, Python | Organic chemistry synthesis and characterization | Gaussian Program

Basic   C++, MATLAB | Computational chemistry methods in coupled-cluster and density functional theory | CFOUR Program