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*

- 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 lifetimes and polarizabilities of laser-cooled 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 aromatic molecules.
- 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, Physical 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 Internationl

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*

Publications & Presentations

Publications

1. C. Hallas, N. B. Vilas, L. Anderegg, P. Robichaud, A. Winnicki, **S. Dawley**, C. Zhang, L. Cheng, J. M. Doyle "Lifetimes for polyatomic molecules in an optical dipole trap" *in preparation*, Phys. Rev. A (2022).

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