daltonian.co
GitHub

Avery Dalton

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Scientist turned software developer with robust analytical and computational skills. Proficient in C# and Python, experienced in C++ and Matlab. Demonstrated excellence in independent research projects. Committed to continuous learning and achievement, I am poised to make valuable contributions to any team.

Work Experience

Staff Scientist 2 Santa Barbara, CA
Applied Research Associates, Inc. 07.2024 - *now*
Statistical/mathematical modeling of electromagnetic pulse phenomena in the atmosphere.

Freelance Software Developer, *part-time* Irvine, CA
Daltonian Scientific 01.2023 - 07.2024
Independent development of applications for chemical analyses
- Developed a C++/Qt application to capture, process, and log real-time RS232 and TCP/IP data from analytical instruments into a database, enhancing laboratory data management and operational efficiency
- Engineered an application in the Python/Qt framework for viewing and analyzing .RAW chromatography files from Thermo Fisher Scientific instruments, generating publication quality graphics
- Designed a specialized Python application utilizing the Tkinter GUI toolkit to facilitate the analysis of quantum chemical data, enhancing research efficiency and data interpretability for theoretical chemists
- Implemented and hosted a suite of JavaScript-based calculators on my personal website, providing users with intuitive and interactive tools for complex calculations for mass spectrometry analyses

Graduate Student Researcher Irvine, CA
Aerosol Photochemistry Lab, UC Irvine 03.2020 - 06.2024
Led research projects in the following areas:
- Quantum chemistry investigations spin-orbit coupling and excited state dynamics
- Solvent/matrix effects on photochemical reaction mechanisms
- Utilized Python, R, and MATLAB in data analysis and publication preparation

Intern Associate Research Scientist Jacksonville, FL
Analytical Research Division, Bacardi Martini Product Development 01.2018 – 07.2019
- Gas & Liquid Chromatography: Performed analytical analyses for components of distilled spirits with GC-FID, GC-ECD, GC-MS, and LC-DAD.
- Wet Chemistry: Conducted numerous analyses for physical properties of distilled spirit samples including alcohol content (DMA), total suspended solids, colorimetry, pH, and sensory analyses.

Certifications & Skills

Professional Data Scientist *DataCamp* 09.2023
Programming Languages: C/C++, Python, MATLAB, R, JavaScript
Technologies: Slurm, Bash, HTML5, XML, MongoDB, MySQL, Scikit-learn
Scientific: Statistics, Quantum Mechanics, Modeling and Simulation, High-performance Computing
Soft Skills: Leadership, Mentoring, Writing, Documentation, Public Speaking, Time Management, Project Management, Graphic Design, Cooperation & Team Work

Education

Ph.D. Physical Chemistry	University of California, Irvine	2021 – 2024
M.S. Chemistry	University of California, Irvine	2019 – 2021
B.S. Chemistry, *Summa Cum Laude*	University of North Florida	2016 – 2018
A.A. General Studies	Eastern Florida State College	2014 – 2016

Projects

Chamber Instrument Management System C++/Qt

A robust application coordinating real-time data acquisition from both serial and IP connections, seamlessly integrating QCharts for dynamic visualization and time-series analysis. Designed to be a lightweight alternative to a LabView program, ensures continuous data integrity and accessibility by automatically storing readings in a database for ongoing monitoring and analysis.

PDA Viewer for Thermo Scientific .RAW Files Python/Qt

Bundled application built as an open-source alternative for the analysis of Thermo Scientific chromatogram files. Built upon Thermo's CommonCore DLLs, this program isolates the data from the diode-array detector and generates publication-ready figures. More information available at daltonian.co/software.

Publications

5) A. B. Dalton, L. M. Wingen, and S. A. Nizkorodov*, Isomeric Identification of the Nitroindole Chromophore in Indole + NO_3 Organic Aerosol, *ACS Physical Chemistry Au*, 2024.

4) K. S. Hopstock, V. Perraud, A. B. Dalton, B. Barletta, S. Meinard, R. Weltman, M. Mirkanian, K. Rakosi, D. R. Blake, R. Edwards, and S. A. Nizkorodov*, Chemical Analysis of Exhaled Vape Emissions: Unraveling the Complexities of Humectant Fragmentation in Electronic Cigarette Vapor, *ACS Chemical Research in Toxicology*, 2024.

3) A. B. Dalton*, D. A. Fishman, S. A. Nizkorodov, Ultrafast Excited-State Proton Transfer in 4-Nitrocatechol: Implications for the Photochemistry of Nitrophenols, *Journal of Physical Chemistry A*, 2023.

2) A. B. Dalton, S. M. Le, N. V. Karimova, R. B. Gerber, S. A. Nizkorodov*, Influence of solvent on the electronic structure and the photochemistry of nitrophenols, *Environmental Science: Atmospheres*, 2023.

1) A. B. Dalton and S. A. Nizkorodov*, Photochemical Degradation of 4-Nitrocatechol and 2,4-Dinitrophenol in a Sugar-Glass Secondary Organic Aerosol Surrogate, *Environmental Science & Technology*, 2021.

Presentations

Evidence of Photoacidic Characteristics by Nitrophenols in Organic Matrices Oct. 2023
Informal Gathering on Atmospheric Science and Photochemistry (poster) *Los Angeles, CA*

Evidence of Photoacidic Characteristics by Nitrophenols in Organic Matrices Oct. 2023
American Association for Aerosol Research conference (poster) *Portland, OR*

Investigating the matrix effects in the photochemistry of atmospheric nitrophenols Mar. 2023
ACS Spring Conference (talk) *Indianapolis, IN*

Photosensitized degredation of secondary organic aerosol by nitrophenols Oct. 2022
American Association for Aerosol Research conference (talk) *Raleigh, NC*

Influence of solvent on the electronic structure and photochemistry of nitrophenols Jun. 2022
Informal Gathering on Atmospheric Science and Photochemistry (poster) *Irvine, CA*

Photochemical candy: Use of isomalt as a proxy for glassy organic aerosol Dec. 2021
PACIFICHEM conference (talk) *Virtual*

Photochemical candy: Use of Isomalt as a Secondary Organic Aerosol surrogate Oct. 2021
American Association for Aerosol Research conference (talk) *Virtual*

The Effects of Antioxidants Within Dark Fruit Extracts on Fission Yeast Morphology Dec. 2017
UNF Natural Sciences Poster Session (poster) *Jacksonville, FL*

Awards and Fellowships

Dissertation Fellowship	University of California, Irvine	2024
Contributions to the Department Teaching Program	University of California, Irvine	2023
Student Travel Award	American Association for Aerosol Research	2022
ACS Undergraduate Award in Physical Chemistry	University of North Florida	2017