

D.W. Rowlands

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PO Box 1205
Greenbelt, MD 20768

EDUCATION

Massachusetts Institute of Technology (MIT)

- S.M. in Physical Chemistry
- Research Advisor: Professor Sylvia Ceyer
- Research Topic: etching and oxidation of Si crystals by molecular beams in ultra-high vacuum
- Completed Teaching and Learning Lab Teaching Certificate Program in Spring 2014

Cambridge, MA
September 2015
GPA: 4.7/5.0

California Institute of Technology (Caltech)

- B.S. with Honors in Chemistry with Minor in History
- Research Advisor: Professor Daniel Weitekamp
- Research Topic: NMR hyperpolarization

Pasadena, CA
June 2009
GPA: 3.7/4.0

RESEARCH EXPERIENCE

Ceyer Lab, MIT Chemistry Department

Graduate Research Assistant

- Repaired and operated an ultra-high vacuum molecular beam set-up, including rebuilding vacuum pumps, leak-checking the system, and aligning the molecular beams and instruments.
- Repaired and maintained electronics including heating power supplies, the RF source for a quadrupole mass spectrometer.
- Rebuilt an Auger electron spectrometer and repaired its control electronics.
- Designed and programmed a classical dynamics simulation in Python to model the collision of gas molecules with a silicon surface.

Cambridge, MA
Jan 2010—Sep 2015

Weitekamp Lab, Caltech Chemistry Department

Undergraduate Researcher

- Designed an experiment to transfer NMR hyperpolarization from xenon to biomolecules.
- Constructed an experimental apparatus necessary to perform hyperpolarization transfer.
- Shimmed high-field NMR magnets.

Pasadena, CA
Jun 2007—Jun 2009

Barton Lab, Caltech Chemistry Department

Undergraduate Researcher

- Performed organic synthesis and thin film and high pressure liquid chromatography.
- Performed fluorescence experiments to evaluate several organometallic complexes as probes of DNA charge transport.

Pasadena, CA
Apr 2006—Aug 2006

NASA Goddard Space Flight Center

High School Researcher

- Took spectra of the sky glow over several cities and spectra of various light pollution sources to identify the light sources responsible for the light pollution sky glow in different cities.
- Developed a set of scripts in Interactive Data Language (IDL) to analyze astronomical spectra and identify their components.

Greenbelt, MD
Sep 2004—Jun 2005

TEACHING EXPERIENCE

University of Maryland, Baltimore County, Chemistry Department **Catonsville, MD**
Visiting Lecturer in Physical and Analytical Chemistry *Aug 2016—present*

- This semester, I am teaching an analytical chemistry lab course for sophomores, which focuses heavily on error analysis and wetlab technique. I am also part of a team teaching general chemistry using a variety of flipped-classroom techniques.
- In Fall 2016, I taught a physical chemistry lab course with a lecture component for upperclassmen. The class focused on instrumentation techniques, MATLAB programming, and formal report-writing.

UMBC Splash **Catonsville, MD**
Volunteer Teacher for Splash Programs *Nov 2016—present*

- Designed and taught one-day courses for high and middle school students.
- Course topics included history of public transportation in Boston and in the US in general, as well as paleontology.

Private Tutor **College Park, MD**
Self-Employed Private Tutor for High School and College Students *Aug 2015—present*

- Tutored high school students in math classes ranging from geometry to calculus, high school chemistry, and high school physics.
- Tutored college students in organic chemistry, algebra, calculus, physics, and statistics.

Anne Arundel Community College, Department of Physical Sciences **Arnold, MD**
Adjunct Professor of Physics *Sep 2015—May 2016*

- In Fall 2015, I was the sole instructor for the introductory physics class Physics 011, covering pre-calculus mathematics (in particular trigonometry) and Newtonian mechanics.
- In Spring 2016, I was a lab instructor for the introductory physical science class Physical Science 100, covering a number of basic chemistry and physics concepts.
- In Spring 2016, I was a lecture instructor for the general chemistry class Chemistry 111.

Cambridge School Volunteers, Inc. **Cambridge, MA**
Scientist Mentor for High School Science Olympiad Team *Nov 2014—Feb 2015*

- Tutored students in preparation for chemistry and timekeeping events at the state Science Olympiad.

MIT Educational Studies Program **Cambridge, MA**
Volunteer Teacher for Splash and Spark Programs *Feb 2010—Nov 2014*

- Designed and taught one-day courses for high and middle school students.
- Course topics included thermodynamics and statistical mechanics, evolutionary biology and paleontology, and American and Boston history.

Massachusetts Institute of Technology, Chemistry Department **Cambridge, MA**
Graduate Teaching Assistant *Aug 2009—Dec 2012*

- TAed freshman chemistry (5.112) twice and undergraduate thermodynamics (5.60) once.
- Ran recitation sections, held office hours, helped write problem sets, and graded problem sets and exams.

PUBLICATIONS

- D.W. Rowlands, “Analysis of Light Pollution Spectra”, *Eleanor Roosevelt High School (Greenbelt, Maryland) Senior Thesis*, (2005).
 - D.W. Rowlands, “Producing Safe Spin-Polarized Metabolites for Magnetic Resonance Imaging”, *Caltech Undergraduate Chemistry Senior Thesis*, (2009).
 - D.W. Rowlands, M.R. Blair, J.-G. Lee, R. Hefty, & S.T. Ceyer, "Making F₂ Heavy: Activated Etching of Si by van der Waals Molecules,” *Poster at Gordon Research Conference on Dynamics at Surfaces*, (2013).
 - D.W. Rowlands, “Xenon Difluoride Etching and Molecular Oxygen Oxidation of Silicon by Reactive Scattering”, *M.S. Thesis, Massachusetts Institute of Technology*, (2015).
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LEADERSHIP EXPERIENCE

Prince George’s County Advocates for Community-Based Transit **Hyattsville, MD**
Head of Research and Member of the Advisory Board *Sep 2015—Present*

- Work on advertising/awareness building and social media for a local transit advocacy group.
- Investigating local demographics and the current state of transit access and potential transit improvements in Prince George’s County, Maryland.
- Providing advice and recommendations to the director as a member of the advisory board.

MIT Graduate Student Council (GSC) **Cambridge, MA**
General Council Representative and Member of the Funding Board *Oct 2013—Jan 2015*

- Represented the Chemistry Department and served on the GSC Housing and Community Affairs committee and the GSC Transportation subcommittee.
- Represented the GSC on the MIT Campus Activities Complex Advisory Board.
- Served as the General Council’s representative on the six-member GSC Funding Board, which allocates \$160,000 to graduate student groups each year. • Consulted with the GSC Treasurer on the design of a new online funding application.

MIT Science Fiction Society **Cambridge, MA**
President, Vice President, and Secretary *Jan 2010—Jan 2015*

- Co-ordinated a major rearrangement of a 60,000-book library to increase shelf space with fixed floor space and improve the organization and navigability of the collection.
- Arranged author visits and talks and organized the annual post-elections retreat.

MIT Association of Student Activities (ASA) **Cambridge, MA**
Treasurer and Student Member at Large *Oct 2011—Oct 2013*

- Chaired the Large Events Fund and Cultural and Diversity Events Funding Board, and prepared allocations totaling \$175,000 to student-run events over the course of one year.
- Served on all student group funding boards and represented the ASA to MIT administration.
- Served as the ASA’s representative on the MIT Campus Activities Complex Advisory Board.
- Organized the reallocation of office space to student groups.
- Chaired the ASA committee in charge of recognizing new student groups.

AWARDS AND HONORS

- MIT Chemistry Department Outstanding Teaching Award (2012-2013)
 - MIT Energy Initiative Fellowship (2010-2011)
 - Dow-Corning Foundation Fellowship (2010)
 - MIT Presidential Fellowship (2009-2010)
 - Arthur A. Noyes Summer Research Fellowship, Caltech (2008)
 - James A. Michener NASA College Scholarship (2006-2009)
 - Robert and Phyllis Henigson Scholarship, Caltech (2006-2008)
 - Vera Cope Weinbach Scholarship, City of New Carrollton, Maryland (2005)
 - National Merit Scholarship Finalist (2004)
 - Maryland Distinguished Scholar Finalist (2004)
 - Caltech Signature Award for demonstrating creativity or innovation in the fields of mathematics and/or the sciences (2004)
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SKILLS

- Proficient with Microsoft Word, Excel, and Powerpoint, and with GIMP (image editing).
 - Proficient with IgorPro (data analysis and plotting); VectorWorks (computer-aided design).
 - Programming in Labview, Matlab, and Python.
 - Repair of ultra-high vacuum systems, including leak-checking and internal repairs.
 - Repair and rebuilding of mechanical and ionization vacuum pumps, and some knowledge of oil diffusion pumps.
 - Mass spectroscopy and time-of-flight mass spectroscopy and helium diffraction.
 - Auger electron spectroscopy.
 - Work with F₂, HF, cryogenics, and in confined spaces.
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