

## ADA SHAW

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### EDUCATION

Bachelor of Science, Chemical Engineering, University of California, Berkeley  
Doctorate of Philosophy, Environmental Engineering, Harvard University

Graduated May 2017  
August 2017-Present

### ACADEMIC RESEARCH AND PRESENTATIONS

- *Analysis of Advection Schemes for Application in a Turbulent Propeller Wake, AM205 Fall 2018*  
We coded and tested three advection schemes: Essentially Non-Oscillating (ENO), Superbee, and Monotonic upwind Scheme for Conservation Laws (MUSCL) using 1-D and 2-D standard testing methods. We applied the lowest error schemes to a steady state velocity field produced by a weather balloon propeller in the stratosphere.  
Language: python, MATLAB
- *Dog Recognition Neural Network, Data Science Final Project, AC209a Fall 2018*  
We optimized and compared ResNet's Neural Networks, Convolutional Neural Networks and Artificial Neural Networks capabilities to predict the breeds of 20,000+ purebred dogs. We used Keras machine learning to implement and test our networks.  
Language: python  
Website: <https://ayshaw.github.io/Dog-Breed-Project/>
- *Verification of Goldbach's Conjecture, CS205 Spring 2018*  
We designed a simple algorithm in C for verifying Goldbach's conjecture and developed several parallel implementations of the code to identify the best strategies for tackling the problem as integer size increases. We tested the following forms of parallelism: OpenMP shared memory parallelism, MPI distributed memory parallelism, Hybrid MPI-OpenMP parallelism, OpenACC GPU accelerated computing.  
Language: C  
Website: <https://github.com/ardwwa/Goldbach>
- *Detecting Ozone Layers from Ozonesondes, EPS236 Fall 2017*  
I developed an algorithm to detect ozone laminae off the coast of Northern California, using data from Trinidad Head, CA ozonesondes. The algorithm was able to filter out high frequency noise, define the free troposphere, recognize high ozone peaks that fit the criteria of free tropospheric ozone laminae.  
Language: R
- *Using a Graphite Cathode as an Electron Donor in Anammox Electrolysis Cell to Investigate Extracellular Electron Transfer, UC Berkeley Honors Research in Alvarez-Cohen Lab*  
I developed a research project designing and building a bioelectrical stimulation reactor to test for extracellular electron transport in Anammox bacteria. I measured nitrate, nitrite and ammonia levels to track Anammox activity at various currents.
- *Airflow Over Heated Objects*  
I determined the volumetric flux above various types of lightbulbs to explore the relationship between flow rate and power consumption. I designed and built a wood/plastic sheet greenhouse structure to prevent outside influence from introducing artifacts in my data. This work was presented at Spring 2016 UC Berkeley Student Undergraduate Research Forum  
Language: MATLAB
- *Keystone Pipeline Mapping Project*  
Worked with a team of students to data mine and develop a web interface that visually relates Keystone pipeline leakages, national watersheds, First Nation Reservation territories. Presented and submitted during Berc CleanWeb Hackathon  
Language: MATLAB, HTML, Javascript, CSS

### RELEVANT EXPERIENCE

#### Graduate internship/collaboration

*Global modeling and Assimilation Office*  
NASA, Goddard, MD

June 2018-December 2018

- Collaborated between Jacob lab and NASA GEOS-5 model development to evaluate chemistry and dynamics of new 132 vertical level atmospheric general circulation model
- Used python to analyze NetCDF output from GEOS-5 simulations
- Identified GEOS-5 model bugs, physical inconsistencies and collaborated with NASA scientists to fix and ensure valid model performance and output

#### Graduate Research

*Harvard University, Cambridge, MA*

**Advisor: Daniel Jacob**  
August 2017-December 2018

*Environmental Science and Engineering, School of Engineering and Applied Sciences*

- Worked on improving the vertical resolution of GEOS-Chem model to predict transpacific pollution influenced high ozone pollution days in western US
- Used Harvard Supercomputing cluster to run GEOS-Chem Chemical Transport Model
- Used R to create an algorithm to detect ozone laminae in ozone profiles
- Analyzed time series outputs to find statistically significant trends in Harvard Forest CO levels

**Undergraduate research**

**Advisor: Lisa Alvarez-Cohen**

*UC Berkeley Department of Civil and Environmental Engineering*

May 2016- May 2017

- Worked on Anammox carbon-fixation pathway project and used ion-exchange chromatography and high pressure liquid chromatography to monitor levels of nitrite, nitrate, ammonia and carbon sources
- Cultivated anaerobic Anammox bacteria on anaerobic media
- Worked with qPCR, 16s ribosomal RNA, and electrolysis to quantify cell culture species in Anammox consortium
- Designed and built a graphite cathode/anode bioelectrical stimulation reactor for Anammox

**Undergraduate research**

**Advisor: William Nazaroff**

*UC Berkeley Department of Civil and Environmental Engineering*

January 2016-August 2016

- Installed and monitored CO<sub>2</sub> probes to help a graduate student conduct CO<sub>2</sub> mixing study in a temperature controlled chamber
- Developed and built a design project to test for geometry of air plumes above a heat source
- Used MATLAB to conduct data analysis and graphs

**Telegraph Green Initiative Grant intern,**

*Telegraph Green Initiative Fund, UC Berkeley*

July 2015-June 2016

- Partnered with and pitched ideas to Telegraph food vendors and district board members to hold sustainability events
- Planned largescale annual educational waste week activities including industrial composting facility demonstrations and public trash auditing
- Typed analytical year end reports to catalogue yearly accomplishments and goals

**SKILLS**

- **Programming Languages** (*in order of most familiar to least*): Python, MATLAB, R, Bash, C, C++, FORTRAN, HTML, CSS, Javascript,
- Proficient knowledge of COMSOL Multiphysics, Unix/Linux based systems, Keras machine learning and Neural Networks, AWS Cloud based computing

**FOREIGN LANGUAGES:**

- Chinese: fluent speaking, reading and writing
- Spanish: limited speaking, reading and writing

**HONORS AND ACTIVITIES**

UC Davis College of Biological Sciences Dean's List

Fall 2013, Fall 2014

UC Davis College of Engineering, Dean's List

Spring 2015

*The Aggie*, UC Davis newspaper, features writer

Spring 2015

Honors Research at UC Berkeley

Fall 2016

Harvard Atmospheric Journal Club

Fall 2017-present