Aaron **Aster**

PH.D. · BACKEND SOFTWARE ENGINEER · DATA SCIENCE ENGINEER

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Summary

I am software engineer who speaks the language of scientists. I desire to apply my science education and software engineer training to tackle interesting business problems.

- My engineering experience lies in machine learning deployment and productionalization, data analysis, visualization, and statistics.
- My scientific expertise lies in materials science, optics, and spectroscopy.
- I am passionate about continuing to grow and creating a supportive environment where others can grow and cultivate their careers.

Skills

Languages — Python, Rust, SQL
Tools — AWS cloud infrastructure, Airflow, Celery, (Python) geospatial computing tools (shapely, rasterio, zarr, xarray, postGIS, GDAL), Python data science tools (sklearn, tensorflow, pandas, numpy), Python exploratory data analysis (jupyter, matplotlib), Python web frameworks (Flask, FastAPI), Git, CI/CD tooling

Experience

Indigo Agriculture
Boston, MA

STAFF DATA SCIENCE ENGINEER (PROMOTED IN 2020 AND 2022)
April 2019 -

- Built an agricultural data validation and imputation engine to power the monetization of sustainable agriculture. Developed validation and imputation methodologies to support the measuring, reporting, and verification of farming activity (38,500 fields, >2.5M acres or ~2.5x the area of Rhode Island). Worked with soil scientists, data scientists, and product owners / managers to integrate software in a pipeline that generates verified carbon credits from organic carbon sequestered in agricultural soils. This work resulted in multiple patents.
- Maintained, updated, and documented a distributed (AWS Lambda, Batch) service that summarizes remote sensing observations over field geometries. Service scaled elastically to meet bursty loads, processing jobs with variable, high concurrency. The service supported arbitrary calculations across imagery bands (e.g vegetative indices from RGB and NIR bands of Sentinel-2) and produced spatial summary statistics, yielding time series collated from hundreds of source images per area of interest. Service integrated with 25+ public imagery products.
- Designed and built an API for providing inferred agronomic activity for user-defined areas of interest. The API served machine learning inferences and public reference data. Inferences were used for data entry and validation in the user-facing front end of multiple sustainable agriculture programs. Built the infrastructure to orchestrate model inference across many unique machine learning model cohorts, persist the results, and gather the predictions into easily consumable API responses.
- Acted as team lead on a new squad that developed the carbon credit generation pipeline for one year. Worked with squad to define intermediate and short-term work planning processes. Mentored junior engineers and fostered a supportive, inclusive environment with space for team member growth.

Climacell
Boston, MA

ALGORITHM ENGINEER
Sep. 2018 - Apr. 2019

- Developed a neural network-based classifier that detected precipitation in nearly real time using cellular data link attenuation time series. Gathered and cleaned historical ground truth data from weather stations to train production models.
- Built a feature generation and prediction pipeline that integrated with the cellular link time series ingest pipeline in production, publishing low-latency precipitation inferences at tens of thousands of locations.

Massachusetts Institute of Technology
Cambridge, MA

PH.D. RESEARCH
Aug. 2012 - May 2018

- Researched the fundamental physics of nanostructured semiconductor materials, relevant to energy conversion, transistors, and light emitting applications. Designed and performed experiments and analysis culminating in a Ph.D. thesis, 11 peer reviewed papers, and a patent.
- Took a course in scientific communication led by experts from the Boston Museum of Science focused on effective oral, written, and visual communication. The course focused on communicating complex topics to diverse audiences. Received conference awards for oral (research talk) and written/visual (poster) communication.

Education

Massachusetts Institute of Technology
Cambridge, MA

PH.D. IN PHYSICAL CHEMISTRY
Aug. 2012 - May 2018

University of Michigan
Ann Arbor, MI

B.S. IN CHEMISTRY AND MATH
Aug. 2009 - Dec. 2012