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, the geospatial software toolbox, 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, pySTAC), Python data science tools (ray, pytorch (lightning), sklearn, pandas, numpy), Python web frameworks (Flask, FastAPI), Git, CI/CD tooling

Experience

Hum

Geospatial Data Wrangler   *July 2025 -*

- Building a "data engine" to gather and unify observations of the Earth from open and commercial data sources as tokens for training a geospatial transformer-based foundation model.
- Creating an ergonomic "model factory" framework to execute configurable and repeatable distributed training runs for arbitrary machine learning models.

Indigo Agriculture   *Boston, MA*

Staff Data Science Engineer (promoted in 2020 and 2022)   *April 2019 - June 2025*

- 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.
- 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.

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*