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Ian Weaver, Ph.D.

Teaching / Software / Outreach

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EXPERIENCE

Private tutor

May 2022 — Present

Onaketa and AJ Tutoring

San Francisco, MA

- Provided in-person tutoring for high school physics and math courses [[AJ Tutoring](#)], and online tutoring/mentorship for high school students from underrepresented backgrounds in STEM [[Onaketa](#)].
- Created custom study materials for students and communicated learning outcomes and progress reports to parents/guardians.

Graduate Student Researcher

Sep 2016 — May 2022

The Center for Astrophysics | Harvard & Smithsonian (CfA)

Cambridge, MA

- Provided spectroscopic time-series observations and follow-up atmospheric analysis for an underrepresented class of exoplanet.
- Accomplished this using Gaussian process (GP) and principal component analysis (PCA) detrending techniques, combined with Bayesian inference frameworks including Markov chain Monte Carlo (MCMC) and nested sampling.
- Utilized high performance computing facilities and schedulers (Torque/PBS, SGE, slurm) via ssh and the command line on different Linux operating systems.
- Taught/mentored several undergraduate courses in Astronomy and received multiple teaching awards.
- Operated and maintained the 0.4 meter Clay Telescope atop the Harvard University Science Center.
- Hosted star parties and other outreach events for the undergraduate and local community.

Course Instructor

Jun 2017 — Sep 2019

Banneker Institute

Cambridge, MA

- Collaborated in the design and execution of a novel summer astronomy workshop through the ISEE Professional Development Program geared towards underrepresented students in STEM.
- Taught 20+ class size emphasizing hands-on and inquiry based learning.

PROJECTS

JuliaAstro [[link](#)]

2020 – Present

Contributor and member of the Julia astronomy organization

- Designed the Keplerian orbit capabilities for the transit modeling package, [Transits.jl](#) [[link](#)], which uses automatic unit and integration testing via GitHub Actions, supports Python interoperability, and produces competitive benchmark performance.
- Implemented several dust extinction models for the interstellar medium observations package [DustExtinction.jl](#) [[link](#)], which provides first-class support for measurements containing units and estimated uncertainties.

Team member, Graduate course final project [[link](#)]

Fall 2019

Python implementation for new algorithm estimating MCMC uncertainty

- Addressed limitations in current definition of the \hat{R} statistic by implementing a new algorithm proposed by Veharti et al. (2019).
- Packaged this deliverable as a set of Jupyter notebooks, including comprehensive documentation, example usage, and sample figures with associated npy and pickle data sets.

Team member, Graduate course final project [[link](#)]

Fall 2018

Python package for differential equation solving, powered by automatic differentiation

- Designed and developed a numerical integration Python package, and demonstrated its usage in fields ranging from Astronomy to Ecology.
- Deployed extensive documentation via [ReadTheDocs.io](#), unit testing with [pytest](#), and bounded registration on [PyPI](#) for the duration of the course.

EDUCATION

Doctor of Philosophy (Ph.D.) in Astronomy, Graduate School of Arts and Sciences, *Harvard University*

May 2022

Master of Arts (AM) in Astronomy, Graduate School of Arts and Sciences, *Harvard University*

May 2020

Bachelor of Science (BS) in Astronomy and Astrophysics, Division of Physical and Biological Sciences, *UC Santa Cruz*

May 2016

Relevant graduate coursework: Advanced Scientific Computing: Stochastic Methods for Data Analysis, Inference and Optimization, Systems Development for Computational Science, Noise and Data Analysis in Astrophysics

ACTIVITIES AND OUTREACH

Graduate School of Arts and Sciences Crew Team

2016 — 2022

Co-Director of science outreach program Open Labs at Harvard (OLAH) [[link](#)]

2018 — 2020

Graduate Student Council Representative

2016 — 2018

Eagle Scout, Troop 255

2012