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Ian Weaver, Ph.D.

Data Scientist / Software Engineer

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EXPERIENCE

- Telescope Operator** Jan 2017 — May 2022
Harvard University Science Center
Cambridge, MA
- 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.
- 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.
- 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.

TECHNICAL SKILLS

Programming and computation: Python, Julia, Plotly, Bokeh, JavaScript, HTML/CSS, Linux, Bash, \LaTeX , Markdown
Tooling: CI/CD workflows, Git, GitHub, make, rclone, Google Cloud Platform, ssh, SQL (ADQL), Table Access Protocol (TAP)
Statistics: Bayesian inference, Nested sampling, MCMC, Variational inference, Stochastic gradient descent, Simulated annealing

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