Locke Patton

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Relevant Experience

Assistant Manager | MetroRock **Everett, MA**
Developed business acumen through managing operations and teaching programs *Summer 2022 - Present*

- Supported 30 staff, running daily operations like scheduling, inventory, desk, sales and customer concerns
- Led staff training, taught classes, and implemented safety procedures to cultivate a safe environment for employees to work and patrons of all abilities to climb
- Ran Somerville public school climbing programs, including curriculum, classes, and safety management

Harvard PhD Program | Graduate Student in Astrophysics **Cambridge, MA**
Traced rapid big star formation to unique galaxy-scale explosions *Fall 2018 – Fall 2021*

- Developed `Python` Bayesian nested sampling models of >200 galaxies on high performance computing cluster with 100,000+ computing hours
- Produced a tool for my colleagues to model and plot galaxies star formation, cutting working time from months to less than five minutes and helping them rapidly turn around to publish their papers
- Scrubbed data from 30+ disparate sources using `Python` into json model-ready format of my own design, producing a first of its kind dataset
- Using linear regression in `Python` , I found statistically significant inconsistencies between published galaxy energy distributions and pushed to reject results in order to maintain best practices
- Visualized and interpreted resulting population statistics for the complete set of superluminous supernovae type I host galaxies, helping understand where they form

Final Project | Markov chain Monte Carlo Parameter Estimation Model **Cambridge, MA**
'Data Analysis for Physicists' Graduate Course *Fall 2020*

- Constructed Bayesian and Frequentist inference and parameter estimation `Python` models from scratch, outperforming classmates in code time runs
- Collaboratively implemented MCMC hierarchical Bayesian rotation model of our galaxy's supermassive black hole, utilizing git version control and predicting a result prior to collaboration publications

Harvard University Teaching Fellow **Cambridge, MA**
Taught Harvard Undergraduates Python and Observational Astronomy Methods Course *Spring 2020*

- Used skills in bash, data analysis, modeling, GitHub and pip to teach first time `Python` and analysis students
- Developed and taught lesson plans and example `Python` workflows, bringing six students from complete beginners to science ready in 4 months
- Mentored students through unique individualized coding projects, producing six original science results in 3 weeks

Undergraduate Research Projects **Seattle, WA**
Prof. Emily Levesque, Prof. Jessica Werk at University of Washington *Fall 2016 - 2019*

- Designed, coded, implemented and published a sonification tool in `Python` to help blind individuals access data - outreached and tested my code within communities, ultimately improving science access
- Under my own initiative, reverse-engineered `C++` code into `Python` package, delivering a bimodal membership distribution code, distilling 3 day runtime down to <30 seconds

Education

Harvard University **Cambridge, MA**
Masters in Astrophysics | Pierce Fellowship *2018–2021*

University of Washington **Seattle, WA**
Bachelor of Science in Physics & Astronomy *2015–2018*

Awards

Harvard Pierce Fellowship: Prestigious grant for demonstrating extraordinary promise *2018-2021*

John P. and Carol J. Merrill Graduate Fellowship: Harvard University *2019*

Chambliss Astronomy Achievement Graduate Award: American Astronomical Society *2019*

UW Mary Gates Research Scholar: Two-time Winner *2016*

Programming & Skills

Technical Competency: AB Testing | Bayesian inference | GitHub | Test Driven Development | Machine Learning | Packaging | High Performance Cluster Computing | MCMC | Bayesian and Frequentist Inference

Python: pandas | numpy | matplotlib | os | json | emcee | dynasty | Jupyter | visualization

Additional Languages: SQL | Bash scripting | Java, Matlab, `C++` Exposure | Mathematica | Latex | French