AARON DEICH

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With extensive experience in physics-centered computation, I have broad expertise in applying computational and mathematical techniques for discovering patterns within data, and in building models that explain & predict past and future behavior of complex systems. I am highly effective in designing software that drives and answers scientific inquiry; and in communicating these insights through clear writing and data visualization.

Data/Software Experience

2018-19 Data Science Consultant, *Lick Observatory,* CA

- I characterized the most likely causes of unexpectedly high starlight measurement error for an $8M robotic planet-hunting telescope by studying correlations across ~30 sensor channels (temperature, windspeed, etc) on 20GB of telemetry data.
- I extracted millions of records across 3 mismatched data sources, then used Jupyter Python notebooks to perform regression analysis and PCA to look for causal relationships.
- My insights were instrumental in guiding engineers where to focus telescope improvement efforts, and the observatory has since reduced the telescope's error by a factor of 3, to theoretical minimum levels. Github project

2014-18 Graduate Research Student, *SJSU*, San Jose, CA

- For my astrophysics research group, I sped up our data collection/analysis process by around a factor of 5 by writing Python/numpy/scipy scripts to hunt for new species of rare galaxies via multidimensional clustering analysis. ApJ paper.

2012-13 Software Engineer, *Markit on Demand,* Boulder, CO

- To support Markit's growth of serving many new financial institutions per month, I built and maintained dozens of custom ETL pipelines for ingesting and storing financial data from remote servers.
- I wrote Python for high-frequency file transfer and transformation; SQL scripts to maintain error-free behavior in our production environment; and logic to manage robust performance across our three local, redundant, company data centers.

Teaching

2016-19 Physics & Calculus Teacher

2018-19 *Jewish Community High School,* San Francisco, CA
2016-17 *Pacific Collegiate School,* Santa Cruz, CA

- I taught AP Physics (both calculus- and algebra-based) and AP Calculus, designing lesson plans around a student-owned, physics-puzzle-based approach. 6 of my 23 AP students have since switched their intended majors to physics.

Education

2018 **MS, Physics,** *San Jose State University,* CA
Focused on scientific computation and data analysis. For my master's thesis, I studied how to better write about physics to draw in readers with beautiful puzzles.

2011 **BA, Physics,** *Reed College*, Portland, OR
I designed and implemented a Monte Carlo simulation to study the effects of supernovae on orbital systems.

Software

Python
numpy, scipy, scikit-learn, pandas, matplotlib, Jupyter

Other languages

SQL, C, Bash, LaTeX

Mathematics

Statistics
- Hypothesis testing
- Regression analysis
- A/B testing
- Monte Carlo simulation
- Bayesian analysis

Multivariate Calculus
- Numerical integration
- Differential Eqn solving
- Analytical modeling

Linear algebra
- Dimensionality reduction (PCA)
- Fourier Analysis
- Clustering and classification ML

Completely Unrelated Expertise Areas

- Downhill mountain biking
- Classical piano
- Electronic music composition