Alex McDaniel, PhD

Data Scientist / Postdoctoral Fellow

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Summary of Qualifications

- Extensive Data Science relevant experience, particularly in applying data analysis and statistical methods to extract meaningful insights from data, and eager to transfer my analytic and problem-solving skills to an industry position.
- Strong programming skills (primarily python, C++) applied to data manipulation, visualization and scientific computing. Well-versed in implementing data analysis pipelines on distributed computing platforms.
- Demonstrated verbal and written communication skills and ability to carry-out complex projects through conference presentations, peer-reviewed publications (6 first-author, full list at alex-mcdaniel.github.io/publications), mentorship of > 10 undergraduate and graduate students in research, and the awarding of multiple research grants.

Data & Technical Experience

2020 – Present **Astrophysics Research Fellow (PostDoc)**, *Clemson University*, Clemson, SC

- Extracted, cleaned, and organized datasets from various astrophysical catalogs containing ∼100s-1,000s of sources to obtain optimal samples for analysis, primarily using pandas and numpy/scipy for relevant data transformations.
- Applied statistical methods (e.g. maximum likelihood estimation) to extract signals from noisy data for a variety of targets over numerous projects, performing simultaneous analyses in populations of ∼ 30 to >500 objects.
- Optimized by a factor of ∼ 10−15x the performance of data analysis pipelines for performing maximum likelihood estimation in python by implementing parallelization methods on remote computing clusters.
- Generated >$150,000 in funding and instrument observation time as Principal Investigator across multiple projects.

2015 – 2020 **Particle Astrophysics Researcher (PhD Candidate)**, *UC Santa Cruz*, Santa Cruz, CA

- Aggregated and analyzed astrophysical data from disparate sources, combining 25+ observations from multiple instruments and 10+ separate targets, while developing custom X-ray data reduction tools with Python and OpenCV.
- Developed in C++ and publicly released the scientific computing tool RX-DMFit (>35 citations), requiring the translation of complex mathematical models into robust, user friendly code.
- Served as graduate student representative on the university Committee on Research, wherein I advised the Chancellor on stakeholder interests related to university research and disbursed >$350,000 in research grants.

Supplemental Data Engagement Projects

See more at alex-mcdaniel.github.io/projects

- Google Advanced Data Analytics (Certificate | Python, Scikit, Tableau ; EDA, ML, Data Visualization, Data for Business)
- Image Style Transfer in PyTorch (Link | Python, PyTorch; ML, neural networks, transfer learning)
- DisYBoost: Predict Physician Recommendations (Link | Python, Scikit, XGBoost; ML, Classification, Decision Trees)
- TikTok Claims Classification (Link | Python, Scikit, XGBoost, Tableau ; ML, Classification, Decision Trees)

Skills

Tools Python (PyTorch, SciKit, pandas, matplotlib, numpy/scipy, seaborn, Jupyter Notebooks, Google Colab), Google Sheets, R, Tableau (public page), C++, SQL

Concepts Statistics, Hypothesis Testing, Differential Equations, Linear Algebra, Machine Learning, Regression & Classification, Random Forest, Boosting Trees, Computer Vision

Education

2020 **Physics PhD**, *University of California, Santa Cruz*, Santa Cruz, CA
Dissertation: Multiwavelength Astrophysical Probes of Dark Matter Properties

2015 **Bachelor of Science**, *University of California, Santa Barbara*, Santa Barbara, CA
Physics Major (Honors), English Minor