Harrison Ellis Sims, PhD

Data Scientist

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PERSONAL STATEMENT

My passion for extracting meaningful insights from complex data sets originates from my 7 years of experience as a data analyst in experimental nuclear physics. This passion has since matured towards analyzing more tangible, real-world problems through which I hope to make a difference in this data-driven world. I believe this background has equipped me to work as a data scientist through robust end-to-end data analyses, development of machine-learning models, and clear result communication.

KEY SKILLS

o Programming languages: Python (Pandas, NumPy, scikit-learn), C++, MATLAB, html/css/js.
o Machine Learning techniques: Linear/Logistic regression, SVM, k-means, NN, Naive Bayes.
o Data visualization tools: Tableau, MatPlotLib and Plotly.
o Relational database experience: SQL and ROOT.
o Communication and presentation skills: Numerous invited talks and Chair opportunities at national and international conferences, as well as research publications and proposals.
o Data analysis: Highly experienced in extracting meaningful results with actionable recommendations from large ($\sim$3 Tb) data sets, even when the data is compromised or incomplete.

PROJECTS

o **Online Recipe Cleaner:** An NLP web-app that scrapes and processes text from a recipe website via a Naive Bayes model and returns the ingredients and instructions to the user. *Python | Scikit-learn | pandas | numpy | Streamlit.*
o **Monte Carlo Solid-Angle Simulator:** An online Monte Carlo simulator of custom, user-defined experimental detectors used to streamline design and analysis. *Monte Carlo | Statistical modelling.*
o **NucSQL - Nuclear Database:** A SQLite database of all historical nuclear data significantly improving information retrieval and calculation efficiency. *SQLite | Python.*

EXPERIENCE

Experimental Data Analyst: Postdoctoral Associate — October 2020 - Present
Rutgers University / Oak Ridge National Laboratory — *New Brunswick, NJ / Oak Ridge, TN*

o Execute full analysis of experimental data from start to finish. Create and maintain analysis frameworks in Jupyter notebooks and C++.
o Simulate experimental data via Monte Carlo as consultation for U.S. and international scientists who are submitting proposals to U.S. facilities. 100% of consulted submissions were accepted with Priority 1.
o Develop and manage codes used by collaborators to improve data analysis and proposal work-flow. For example I constructed a Tableau dashboard that calculates nuclear reaction properties based on user-input. This allowed collaborators to simulate data *themselves*, streamlining analysis and proposal processes.
o Mentor and support graduate and undergraduate students in their research. Assist in data analysis (often with fitting routines) and statistical analysis concepts in general.

Internship - Detector Diagnostics, Nuclear and Particle Physics group — June 2017
Lawrence Livermore National Laboratory — *Livermore, CA*

o Developed a method to quickly diagnose a particle detector through automated data analysis, minimizing time lost during experiments.

Ph.D. Graduate research — September 2016 - October 2020
Rutgers University / Oak Ridge National Laboratory — *New Brunswick, NJ / Oak Ridge, TN*

o Cleaned, calibrated and analyzed data from the ^{84}Se(d,p) reaction using ML techniques to further inform the modelling of nuclear weapon detonations, as well as thermonuclear reactions in supernovae.
o Characterized and tested multiple detector types via custom-made linear regression models.

EDUCATION

Rutgers University — **New Brunswick, NJ**
Ph.D. Physics — *January 2021*

University of Surrey — **Surrey, United Kingdom**
MPhys, Physics with nuclear astrophysics — *May 2016*