Zachary Raup

Data Scientist
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Summary

- Physics graduate with certifications in Data Science and Data Analysis, equipped with a strong foundation in building predictive models and driving data-driven insights in diverse fields, including astrophysics, medical devices, and retail.
- Proficient in Python and SQL, with extensive experience in analyzing and interpreting complex datasets
- Committed to continuous learning, integrating new tools and technologies to drive innovation and optimize development workflows.

Education

Kutztown University of Pennsylvania (KU) — Kutztown, PA
B.S. in Physics — December 2022
Overall GPA: 3.92 — Summa Cum Laude
Awards: Chambliss Student Academic Achievement Award, Roy W. Hamme Memorial Award, KURF Grant, and NSF IRES Grant

Technical Skills

Programming Language: Python (scikit-learn, statsmodels, matplotlib), SQL, MATLAB
Database: MySQL, PostgreSQL
Cloud Platforms: AWS
Software: Jupyter notebook, Microsoft Power BI, Tableau, Git, LaTeX, Microsoft Office

Experience

- **Senior Manufacturing Tech** — Exton, PA
  DSM - Firmenich Biomedical — March 2023 - Present
  - Developed G-Code programs for CNC lathe machines that manufacture medical devices using GMP techniques in a 5S clean room environment.
- **Astrophysics Researcher** | **KURF Grant** — Kutztown, PA
  Kutztown University — October 2021 – March 2023
  - Constructed **Python** programs to model transit and radial velocity data, estimating key exoplanet and binary star parameters to advance understanding of stellar systems.
- **Astronomy Researcher Intern** | **NSF IRES Grant** — Toowoomba, QLD, Australia
  University of Southern Queensland — May 2022 – August 2022
  - Analyzed photometric data from TESS and Mt Kent Observatory using **Python** to predict future exoplanet transit times, contributing to planetary candidate validation.

Certifications

Data Scientist Associate (DataCamp) | **Data Analyst Associate** (DataCamp) | **Python Data Associate** (DataCamp) | **SQL Associate** (DataCamp)

Projects *(Available on GitHub)*

- **Walmart Sales Prediction** | **Regression Modeling**
  Built and evaluated regression models (Random Forest, Boosted Tree Regression) to predict weekly retail sales using Walmart's store and economic data. Achieved 96.36% variance explained (R^2), enabling optimized inventory management and demand forecasting.
  *Skills: Machine Learning, **Python** (scikit-learn), Regression Analysis, Data Science*
- **Predicting Diabetes Using Machine Learning** | **Classification Models**
  Developed machine learning models (Logistic Regression, KNN, Random Forest, SVM) to classify diabetes status. Key insights identified glucose, BMI, DPF, and age as critical features for prediction.
  *Skills: **Machine Learning**, Python (scikit-learn), Classification Modeling, Cross-Validation*
- **Exoplanet Transit Analysis** | **MCMC Modeling**
  Used MCMC in Python to model exoplanet transits and fit CRCAO photometry data with the batman package, estimating parameters like planet radius and transit timing. Presented findings at the 241st AAS meeting.
  *Skills: **Python** (emcee, batman), Data Visualization, Data Analysis*

Publications

Jack, S., Raup, Z., et al. (2024). Migration and evolution of eccentric planets (MEEP) I: Nine newly confirmed hot Jupiters from the TESS mission. *arXiv:2401.05923*.

Conference Presentations

- **Raup, Z** & Reed, P (2023). Follow-up Observations Toward the Confirmation of TESS Transiting Exoplanet Candidates TOI-3645, TOI- 3660, and TOI-4153. 241st American Astronomical Society. Seattle, WA
- **Raup, Z** & Reed, P (2022). Follow-up Observations of TESS Transiting Exoplanet Candidate TOI 3645.01. 42nd Central Pennsylvania Consortium Astronomers' Meeting. Gettysburg College. Gettysburg, PA