# Zachary Raup

*Data Scientist*
Reading, PA

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GitHub Portfolio: zraup.github.io/Zachary-Raup/

## Summary

- Data scientist with a strong foundation in machine learning, Python, and SQL.
- Proven track record in building predictive models and driving data-driven insights in diverse fields, including astrophysics, medical devices, and retail.
- Expertise in data analysis, model deployment, and optimizing workflows for improved decision-making.
- Passionate about utilizing data science techniques to solve real-world problems and improve operational efficiency.

## 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*.