

Zachary Raup

Data Scientist
Reading, PA

Email: Zachary.Raup@mail.com
LinkedIn: [linkedin.com/in/zachary-raup-6280a3265](https://www.linkedin.com/in/zachary-raup-6280a3265)
GitHub Portfolio: [zraup.github.io/Zachary-Raup/](https://github.io/Zachary-Raup/)

Summary

Physics graduate with a strong foundation in machine learning and statistical analysis, supported by hands-on experience across astrophysics, healthcare, and retail. Proven ability to build, evaluate, and communicate predictive models, with a focus on scientific rigor and clarity. Adept at Python and SQL, with a deep commitment to learning and applying new tools to solve complex, real-world problems.

Education

DataCamp

Certificate: Data Scientist with Python Career Track

September 2024

Core Topics: Python Programming, Data Cleaning, Exploratory Data Analysis, Machine Learning, SQL, Git, Data Visualization

Kutztown University of Pennsylvania (KU)

B.S. in Physics

Kutztown, PA

Overall GPA: 3.92

December 2022

Summa Cum Laude

Awards: Chambliss Student Academic Achievement Award, Roy W. Hamme Memorial Award, KURF Grant, NSF IRES Grant

Technical Skills

Programming: Python (pandas, scikit-learn, matplotlib, PyTorch), SQL, MATLAB

ML & Analysis Tools: Jupyter, Power BI, Tableau, statsmodels, Git, LaTeX

Database Systems: MySQL, PostgreSQL

Cloud Platforms: AWS (EC2, S3)

Other: Microsoft Office, GitHub, shell scripting

Experience

Senior Manufacturing Tech | Manufacturing Tech II | Manufacturing Tech I

Exton, PA

DSM - Firmenich Biomedical

March 2023 - Present

- Programmed CNC lathe machines using G-Code to manufacture precision medical devices under GMP/cleanroom standards.

- Maintained high standards for documentation and cross-functional team communication.

Undergraduate 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.

Undergraduate 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 refine 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)

Chest X-Ray Pneumonia Detection with Deep Learning

Built an ensemble pipeline using ResNet18, DenseNet121, and EfficientNet-B0 with transfer learning, 5-fold cross-validation, and Grad-CAM interpretability. Achieved 93% accuracy.

Skills: PyTorch, CNNs, Model Ensembling, Medical Imaging, Cross-Validation, Grad-CAM

Discovering Similar Songs Using Machine Learning

Used dimensionality reduction (t-SNE, NMF) on Spotify audio features and built a cosine-similarity recommender.

Skills: Unsupervised Learning, Recommender Systems, Plotly, pandas

Walmart Sales Prediction

Trained regression models (Random Forest, Boosted Trees) to forecast weekly sales with over 96% R^2 score.

Skills: Regression Modeling, scikit-learn, Feature Engineering

Predicting Diabetes Using Machine Learning

Developed classifiers (Logistic Regression, KNN, Random Forest, SVM) to predict diabetes using patient metrics.

Skills: Classification Modeling, ROC Curves, Feature Importance

Publications

Schulte, J., Raup, Z., et al. (2024). *Migration and Evolution of Giant ExoPlanets (MEEP) I: Nine Newly Confirmed Hot Jupiters from the TESS Mission*. [arXiv:2401.05923](https://arxiv.org/abs/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