

# Zachary Raup

Data Scientist  
Reading, PA

Email: [Zachary.Raup@mail.com](mailto: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 and certified Data Scientist with hands-on experience applying machine learning in healthcare, retail, and astrophysics. Skilled in Python, SQL, and deep learning, with a proven ability to build and communicate predictive models. Passionate about using data to solve real-world problems with clarity and impact.

## 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

Overall GPA: 3.92

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

Kutztown, PA

December 2022

Summa Cum Laude

## 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

DSM - Firmenich Biomedical

Exton, PA

March 2023 - Present

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

- Leveraged data logs or production metrics to monitor machine performance and process reliability.

### • Undergraduate Astrophysics Researcher | KURF Grant

Kutztown University

Kutztown, PA

October 2021 – March 2023

- Built **Python** models to analyze transit/radial velocity data, estimating key exoplanet and binary star parameters to advance understanding of stellar systems.

### • Undergraduate Astronomy Researcher Intern | NSF IRES Grant

University of Southern Queensland

Toowoomba, QLD, Australia

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 91% 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).