Zachary Raup

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Education

Kutztown University of Pennsylvania (KU) — Kutztown, PA
B.S. in Physics — January 2021 - December 2022
Overall GPA: 3.92
Summa Cum Laude

University of Cincinnati (UC) — Cincinnati, OH
B.S. in Sport Administration — August 2016 - April 2019
Overall GPA: 3.86
Magma Cum Laude

Certificates & Courses

- **Exploratory Data Analysis in Python** - DataCamp   June 2024
- **Data Visualization in Tableau** - DataCamp   June 2024
- **Data Visualization in Power BI** - DataCamp   June 2024
- **Managing Big Data with MySQL** - Duke University   June 2024
- **Python** - Kaggle   February 2023

Programming and Software

- **Python**   Since 2021

    - Proficient in Python with extensive application in **astrophysics research**.
    - Skills include **Pandas, Matplotlib, seaborn, Scikit-Learn**, SciPy, NumPy, emcee, etc.
    - Specialized in exploratory **data analysis, data cleaning, and advanced modeling** techniques.

- **MySQL**   Since 2024

    - Developed **SQL** skills through 'Managing Big Data with MySQL' course.
    - Experienced in designing relational databases, **writing advanced queries, data cleaning, and thorough data analysis**.

1

– Proficient in optimizing databases for handling **large datasets** effectively.

- **Tableau** Since 2024

  – Trained in 'Data Visualization in Tableau'.

  – Proficient in **transforming complex datasets** into actionable insights through **dynamic visualizations and interactive dashboards**.

  – Skilled in **data visualization, analysis, and communication** for informed decision-making.

- **Microsoft Power BI** Since 2024

  – Fundamental skills in Power BI through 'Data Visualization in Power BI'.

  – Capable of creating compelling **data visualizations, interactive reports, and dashboards**.

  – Expertise in facilitating data-driven decision-making through insightful visuals.

- **Teradata** Since 2024

  – Skills acquired alongside MySQL training for querying and **analyzing large datasets**.

  – Proficient in **database management, SQL querying**, and deriving actionable insights from complex datasets.

- **AstroImageJ** since 2021

  – Advanced proficiency in AstroImageJ for photometry **data cleaning, reduction, and analysis**.

  – Used extensively in **exoplanet research** for producing detrended and fitted light curves.

- **Microsoft Office** Since 2012

  – Advanced proficiency across **Excel, Word, PowerPoint**, and other office applications.

  – Applied skills in **data manipulation** through school work, laboratory reports, and various disciplines.

- **MATLAB** Since 2022

  – Proficient in MATLAB for conducting **numerical analysis and research projects**.

  – Utilizing its robust tools for **data analysis, modeling, and simulation** tasks, enhancing capabilities in scientific and **engineering applications**.

- **LaTEX** Since 2023

  – Proficient in LaTeX for creating **professional documents**.

- Adept at formatting and presenting complex data analysis, research findings, and **technical reports** with precision and clarity, ensuring **effective communication** in academic and professional settings.

Professional Experience

- **DSM- Firmenich Biomedical** — Exton, PA
  Manufacturing Tech II — April 2024 - Present
  Inventory management for the tooling molding machines. Using **GMP** and **engineering** techniques to manufacture bio-absorbable polymer surgical screws.

- **DSM- Firmenich Biomedical** — Exton, PA
  Manufacturing Tech I — March 2023 - April 2024
  Manufacturing bio-absorbable polymer surgical screws with various molding and CNC lathe machines, demonstrating the ability to **learn fast** and understand new manufacturing techniques quickly.

- **Weis Markets Distribution Center** — Milton, PA
  Warehouse Associate — May 2018 - January 2021
  Assembling orders and packed items to be transported to regional stores.

- **Selinsgrove Area School District** — Selinsgrove, PA
  Athletics Intern — January 2019 - June 2019
  Game manager during all home sporting events, reviewed the team schedules prior to each week to ensure each game had correct information (field, referees, buses, etc.).

- **University of Cincinnati** — Cincinnati, OH
  Ticket Sales Associate — August 2018 - December 2018
  Responded to inbound sales calls, responded to inquiries and provided information and/or follow up materials as requested.

Research Experience

- **Spectrogragh & Transiting Exoplanets | NSF IRES Grant**
  University of Southern Queensland — Toowoomba, QLD, Australia
  Dr. Rob Wittenmyer — May 2022 – August 2022

  - Construct, align, and focus a low- resolution spectrograph that collects spectral data of high mass stars at the Mt. Kent Observatory (Australia).
  - Predicting future transit times of exoplanets by writing **python** programs that analyze and reduce photometry data from TESS and Mt Kent Observatory to accurately update their current t0 and period value.

- **Exoplanets and Binary Star Research | KURF Grant**
  Kutztown University — Kutztown, PA
  Dr. Phillip Reed — October 2021 – March 2023

- Writing **python** programs that model and fit the transit and radial velocities of star systems w/an exoplanet or binary star and determining the mass and radius of the transiting object using data collected from C. R. Chambliss Astronomical Observatory (CRCAO) and the Transiting Exoplanet Survey Satellite (TESS).

- Collecting spectroscopy & photometry data of potential exoplanets using the 0.61m telescope at CRCAO. Performing maintenance on the telescope to keep the instruments running optimally displaying **problem solving** and **critical thinking** skills.

Publications

- Jack S., Raup, Z., et al (2024). Migration and Evolution of Eccentric Planets (MEEP) I: Nine Newly Confirmed Hot Jupiter from the TESS Mission. arXiv:2401.05923

Conferences

- **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

Leadership & Volunteering

- **DSM - Firmenich Safety Committee**   Exton, PA
  Member   March 2024 - Present
  Planning and implementing safety procedures at the DSM Biomedical Site.

- **DSM - Firmenich Spill Response Team**   Exton, PA
  Member   September 2023 - Present
  Responsible for responding to chemical spills and carrying out the safety contingency plan at the DSM Biomedical Site.

- **Society of Physics Students**   Kutztown, PA
  Student Member   August 2021 - December 2022
  Student outreach through club organised events, organise and participate in physics and science challenges, promoting research opportunities within the Physical Sciences Department.

- **Community Outreach Planetarium Shows**   Kutztown, PA
  Volunteer   Fall 2022 - Fall 2023
  Organize local community events through the planetarium by hosting laser light shows and having public telescope viewings of Saturn and Jupiter.

- **Bearcat Buddies** Cincinnati, OH
  Volunteer August 2017 - December 2017
  Engaged in tutoring at the Cincinnati Public Schools (Elementary level), providing educational support and guidance to enhance students' academic achievements.

Awards & Scholarships

- Chambliss Student Academic Achievement Award Kutztown University
  Silver Medal April 2023

- Roy W. Hamme Memorial Award Kutztown University
  Highest achieving student in Physical Sciences Fall 2022 - Spring 2023

- KURF Grant Kutztown University
  Kutztown University Undergraduate Research Funds December 2022

- National Science Foundation International Research Experience for Students Grant
  Kutztown University
  Research Advisor: Dr. Phillip Reed May 2022 – August 2022

- Dean's List Kutztown University
  Spring 21 – Fall 22

- Dean's List University of Cincinnati
  Spring 17 – Spring 19

Professional Memberships

- Sigma Pi Sigma, Honor Physics Student Society April 2023 - Present

- Society of Physics Students (SPS) September 2021 - December 2022

- American Astronomical Society (AAS) September 2022 - Present

- National Society of Collegiate Scholars January 2017 - May 2019