Rhys Shaw

Astrophysics PhD Student | Data Scientist and Programmer.

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Summary

Final-year Astrophysics PhD Student at the University of Bristol, with expert skills in Machine Learning, Data Analysis, and Programming.

Education

PhD in Physics ***2026***

Machine Learning and Analysis Techniques for Extra-Galactic Astronomy.

University of Bristol, Bristol

MSc Data Intensive Astrophysics ***2021***

The Effect of Fractal Substructure in Early Stellar Cluster Evolution.

Cardiff University, Cardiff

BSc Physics with Astrophysics ***2020***

Exploring the bias in X-ray and SZ selected galaxy clusters using scaling relations.

University of Bristol, Bristol

Awards

AIMLAC CDT PhD Studentship ***2022***

University of Bristol

Awarded a fully funded PhD studentship from the AIMLAC CDT at the University of Bristol.

BSc Research Project Commendation ***2020***

University of Bristol

Commendation for research exploring the bias in X-ray and SZ selected galaxy clusters using scaling relations.

Technical Skills

Programming languages

Python JavaScript Fortran C++ C Rust

ML/AI

PyTorch TensorFlow HuggingFace Transformers

Tools

Linux Git Docker HPC MongoDB HTMX FastAPI Slurm

Work Experience

Data Science Intern ***2024***
Aleph Insights, London

Engineered an internal LLM client tool to interact with various LLM APIs while ensuring local data storage and local network document integration. Developed a full-stack web application using FastAPI and HTMX for the front and backend, with data managed in MongoDB.

Postgraduate Teaching Assistant ***2026***
University of Bristol, Bristol, England

Provided lab demonstrations and technical guidance to second-year undergraduates completing research projects. Leveraged detailed knowledge of physics experiments to evaluate student progress through interviews and the marking of technical reports.

Other Experience

DataAid Committee Member ***2024-2026***
DataAid, Bristol

Committee member for a student-led hackathon providing data science support to non-profits. Responsible for event organization, technical feasibility assessment of charity projects, and providing on-site technical support to participants.

Astrophysics Developer Group co-Lead ***2025-2026***
University of Bristol, Bristol

Co-lead of an open group for PhD students and academics focused on research software development. Facilitate weekly discussions on coding challenges and deliver tutorials on topics including parallelization, self-hosting, Git, and Docker.

Projects

STILTS-NLI ***View Project***

A natural language interface for the astrophysics software STILTS, featuring a CLI that utilizes a fine-tuned, open-source language model.

DRUID ***View Project***

A Python package developed for my PhD that performs source finding on astronomical images using persistent homology.

Personal Website ***View Project***

A self-hosted portfolio site built using FastAPI and HTMX.

HomeLab

A self-hosted server environment running various services, including Immich for photo storage and a Zotero WebDAV cloud.

Publications

Collaboration, E., Zatarain, T. M., Fotopoulou, S., Ricci, F., Bolzonella, M., Franca, F. L., Viitanen, A., Zamorani, G., Taylor, M. B., Mezcua, M., Laloux, B., Bongiorno, A., Jahnke, K., Stevens, G., Shaw, R. A., Bisigello, L., Roster, W., Fu, Y., Margalef-Bentabol, B., … Soubrie, E. (2025, March). *Euclid Quick Data Release (Q1). The active galaxies of Euclid.* arXiv. https://doi.org/10.48550/arXiv.2503.15320

Shaw, R. A., Fotopoulou, S., Birkinshaw, M., Maddox, N., & Stewart, H. (2025). DRUID: source detection and deblending in astronomical images with persistent homology. *RAS Techniques and Instruments*, *4*, rzaf6. https://doi.org/10.1093/rasti/rzaf006