

Payton E. Rodman

[/payton-rodman](#) www.paytonelyce.com [/paytonrodman](#)

Experience

Software Engineer

Mar 2025 – Present

Darktrace

Cambridge, UK and Den Haag, NL

- Developed and maintained software for real-time data acquisition and processing across cloud environments.
- Integrated new components into existing production systems, from design through to deployment.
- Collaborated with cross-functional teams to ensure system reliability and data integrity at scale.

PhD Researcher

Oct 2019 – Dec 2024

Institute of Astronomy, University of Cambridge

Cambridge UK

Thesis: Magnetic field evolution in black hole accretion disks and relativistic jets

[Code]

- Developed and maintained high-performance C++ simulation software for large-scale astrophysical plasma simulations.
- Processed and analysed ~100TB of distributed simulation data using MPI-parallelised Python workflows on HPC clusters.
- Implemented new numerical and data-processing modules within established scientific software frameworks, following existing engineering standards and testing practices.
- Optimised simulation and analysis workflows for scalability and computational efficiency across multi-node environments.
- Communicated technical findings through peer-reviewed publications, and conference presentations.

Education

PhD Astronomy

2019 – 2024

University of Cambridge, Institute of Astronomy / Churchill College

Cambridge, UK

Gates-Cambridge scholar

BSc (Hons) Physics

2018

University of Tasmania

Hobart, AUS

GPA: 7.0/7.0 and University Medal

BSc Physics and Applied Mathematics

2015 – 2017

University of Tasmania

Hobart, AUS

GPA: 7.0/7.0

Technical Skills

Programming / scripting languages: Python, C++, MATLAB, SQL

Cloud platforms: AWS, Azure, GCP (telemetry, audit logging, IAM/auth integration)

Infrastructure/DevOps: git, CI/CD, HPC, Redis, Docker

Analysis and visualisation: pandas, numpy, scipy, astropy, h5py, VisIt, mpi4py, matplotlib, seaborn

Scientific computing: Athena++, PLUTO

Languages: English (native), French (A2)

Projects

Mapping barometric pressure migraine risk worldwide [Code]

- Mapped geographic trends in barometric pressure variation, a common trigger for migraine headache.
- Analysed and cleaned 10 years of historical weather data from 8,189 weather stations across 210 countries in Python.
- Produced unit tests to verify the output of core functions under the pytest framework.

Probing intracluster gas with Faraday Rotation from black hole jets Feb 2018 – Nov 2018 *Honours thesis* [Blog]

- Used Faraday Rotation measurements of black hole jets to investigate their potential for constraining host galaxy properties.
- Produced and analysed analytic jet and galaxy cluster models in Python.
- Improved galaxy mass estimates sixfold by including Faraday Rotation data.
- Reported findings in print and contributed talks at conferences and meetings.

The spectral signature of interstellar scintillation Nov 2016 – Feb 2017 *Summer Research Intern - CSIRO Astronomy and Space Science (CASS)* [Code]

- Analysed spectral data from 2,232 quasars observed in the Australian Telescope Extreme Scattering Events (ATESE) survey to quantify radio source variability.
- Developed and validated a structure function-based approach for assessing scintillation strength.
- Verified a new method for real-time detection of Extreme Scattering Events on historical data, identifying three new candidates.

Radio Galaxy Zoo: observational evidence for environment as the cause of radio source asymmetry Nov 2015 – Feb 2016 *Summer Research Intern - University of Tasmania*

- Utilised data from the citizen science project *Radio Galaxy Zoo* to study whether nearby galaxy clustering affects the physical properties of galaxy jets.
- Analysed properties of an initial sample of 2,679 candidate sources, utilising observational data from SDSS and radio surveys (FIRST and ATLAS) obtained using SQL.
- Validated predictions of radio source dynamics models, showing that denser environments negatively correlate with lobe extension and luminosity for FR-II sources at a 4σ level.
- Findings reported in print and presented at conferences.

Highlighted Awards and Scholarships

2024: Churchill College Conference On Everything Prize *for best talk in the physical sciences*

2019: Gates-Cambridge Scholarship


2019: University Medal

2018: Dean's Honour Roll *for Bachelor of Science with Honours*

2018: Ken McCracken Prize *for the best Honours thesis in the discipline of Physics*

2018: Vice-Chancellor's Leadership Award

Publications

4 publications in peer-reviewed journals, 2 first-author. Full record available at  <https://orcid.org/0000-0002-1624-9359>