Maxwell Catmur

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# Profile

Aspiring Quantitative Researcher skilled in Python, numerical simulation and machine learning, with practical experience in time series analysis, feature engineering and experiment design. Collaborative problem-solver who translates models into actionable results; seeking a Quant role at Jane Street.

# Education

**MPhys Physics – University of Warwick October 2022 – July 2026**

**Grade:** First (expected)

* Strong performance across years: 85%, 89%, 82% in Years 1–3 respectively; relevant modules include scientific and high-performance computing, advanced mathematical methods and statistical physics.
* Investigated metastability of nucleation in the 2D Ising model using dozens of Monte Carlo simulations in MATLAB; co-authored a paper with two peers within three weeks.
* Numerically solved partial differential equations in C using finite-difference methods to model industrial heat flow; achieved 95% on the task.
* Ran over 10,000 N-body simulations using a Python integrator, applying MEGNO for orbital stability quantification and advanced post-processing to interpret results.
* Co-developed a PID stabilisation algorithm in LabVIEW for a nodding-donkey system, improving stability and adding angle-control features.

**A-levels – Forest School September 2020 – July 2022**

**Grade:** A\*A\*A\*A\*A\* (Maths, Further Maths, Physics, Chemistry, Extended Project)

* Sixth-form valedictorian for academic performance.
* 5000-word Extended Project on mitigation of climate change (renewables, nuclear, geoengineering), awarded 100%.
* Presented project findings to 160+ students and staff, demonstrating clear and precise public communication.

# Work Experience

**Undergraduate Researcher June 2025 – October 2025**

Warwick Mathematics Institute

* Modelled finite-difference methods for wave propagation across 100+ aeroacoustics simulations, implementing and validating numerical schemes.
* Designed and ran simulation experiments to compare 10 maximal-order and dispersion-relation-preserving schemes in MATLAB, optimising for accuracy versus computational cost.
* Analysed time-series outputs and produced concise visualisations and a 2-page poster summarising methods and results for a departmental event.

**Project Manager January 2024 – March 2025**

Warwick Aerospace Society

* Led a 12-member student team developing a proof-of-concept UHF satellite ground station; scheduled and chaired weekly meetings and coordinated four specialised sub-teams.
* Authored 30+ pages of technical documentation and bills of materials, applying structured experiment design and selection matrices for antenna choice.
* Initiated MATLAB/Simulink modelling of rotator-control and implemented GitHub-based version control for collaborative development.

**RF Seekers Summer Intern June 2024 – August 2024**

MBDA UK

* 10-week placement in the Modelling and Algorithms team working on SAR range–Doppler processing chains for AESA radar systems.
* Optimised a matched-filter algorithm in MATLAB using FFT methods, reducing runtime by 85% and improving end-to-end processing performance.
* Co-developed a data-analysis application used by six colleagues to inspect range–Doppler images, integrating a mid-fidelity algorithm for rapid sanity checks.
* Delivered 50+ commits using professional development practices and version control; researched literature to inform algorithmic choices and validation.

**Academic Coordinator March 2024 – March 2025**

Warwick Physics Society

* Delivered seven revision lectures and ran weekly academic support sessions for peers, explaining complex concepts clearly and receiving excellent feedback.
* Organised a departmental 10-year anniversary talk attended by 100+ students and academics (guest: Prof Dame Athene Donald).
* Coordinated teaching materials and schedules to support cohort performance in end-of-year assessments.

# Projects

**AI CV Generator July 2025 – ongoing**

* Developed a CV and cover-letter generator in Python using OpenAI's API, producing structured JSON outputs and templated Word documents via docxtpl.
* Ensured reproducible schemas with Pydantic BaseModel and implemented two SQL databases to track applications and pipeline state.
* Optimised pipelines for ATS compatibility; achieved >50% on three ATS-checker sites and contributed to two job offers after 200 applications.
* Applied software engineering practices: modular code, version control and basic experiment tracking for iterative model improvements.

# Skills

**Languages**: Python, MATLAB, C, SQL, JSON, HTML/CSS/JavaScript.

**Libraries:** NumPy, SciPy, Matplotlib, Pydantic, openAI.

**Tools:** Git / GitHub, Simulink, LabVIEW, MATLAB toolboxes, Version control and reproducible pipelines.

**Soft Skills:** Analytical and quantitative thinking, Collaborative teamwork and cross-functional communication, Clear and precise written/verbal communication, Intellectual curiosity and continuous learning, Project leadership and documentation.

**Interests:** Machine learning, Time series analysis, Feature engineering, Amateur radio, Debating.