Maxwell Catmur

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# Profile

Aspiring Quantitative Researcher (2026) with strong Python programming, statistical modelling and simulation experience. Skilled in dataset generation, experiment design and model evaluation. Collaborative communicator with intellectual curiosity and a track record of turning research into practical, reproducible systems.

# Education

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

**Grade:** First (expected)

* Consistent high marks across years (85%, 89%, 82%); relevant modules include scientific and high-performance computing, advanced mathematical methods and statistical physics.
* Investigated metastability of nucleation in the 2D Ising model via dozens of Monte Carlo simulations in MATLAB; co‑authored a short paper within three weeks.
* Ran 10,000+ simulations with an N-body integrator in Python; implemented MEGNO for orbital stability quantification and developed post‑processing pipelines.
* Numerically solved partial differential equations in C using finite difference methods to model industrial heat flow, demonstrating numerical stability and accuracy (95%).
* Led two group research projects (6 members each), scheduling meetings, delegating tasks and communicating results to supervisors.

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

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

* Sixth form valedictorian; strong background in mathematics and physics supporting quantitative problem solving.
* Produced a 5,000‑word Extended Project on climate‑mitigation technologies (100%) demonstrating independent research and experiment design skills.
* Presented project findings to a cohort of 160+ students and staff, illustrating clear and precise communication.

# Work Experience

**Undergraduate Researcher June 2025 – October 2025**

Warwick Mathematics Institute

* Modelled wave propagation using finite difference methods across 100+ aeroacoustics simulations, generating reproducible datasets for evaluation.
* Benchmarked 10 maximal‑order and dispersion‑relation‑preserving schemes in MATLAB, optimising accuracy versus computational cost (experiment design and performance analysis).
* Prepared and presented a research poster summarising methods, results and next steps to academic peers, communicating technical findings precisely.

**Project Manager January 2024 – March 2025**

Warwick Aerospace Society

* Managed a 12‑member, cross‑functional team to design and build a proof‑of‑concept UHF satellite ground station, coordinating engineering, procurement and testing.
* Established four specialised sub‑teams, chaired weekly meetings and maintained project documentation (30+ pages), ensuring timely delivery within 10 weeks.
* Introduced GitHub version control for model development and led MATLAB/Simulink modelling of rotator control, improving reproducibility and handover to engineers.

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

MBDA UK

* Ten‑week placement in the Modelling and Algorithms team working on synthetic aperture radar (SAR) pipelines for AESA radar systems. Focused on data processing and model evaluation.
* Optimised a matched‑filter algorithm in MATLAB by applying FFT methods, reducing runtime by 85% and improving full‑system throughput.
* Co‑developed a data analysis application used by six colleagues for rapid inspection of range–Doppler imagery; contributed 50+ commits using professional version control practices.

# Projects

**AI CV Generator July 2025 – ongoing**

* Built a Python application using OpenAI API and Pydantic to generate structured CVs and cover letters tailored to job descriptions (dataset generation and structured outputs).
* Implemented conversion to Word documents with docxtpl and stored application records in two SQL databases to track outcomes and iterate on prompts.
* Measured performance with ATS checkers (>50% on three sites) and used feedback to refine outputs; tool contributed to receiving two job offers after 200 applications.

**Drinks Ordering Web App August 2018 – September 2018**

* Developed a web application using Ajax and JavaScript to handle orders for a 100+ guest event, processing 80+ orders in six hours and eliminating queues.
* Implemented asynchronous order updates and real‑time status notifications to improve user experience and reduce service time.
* Deployed and iterated the application based on user feedback; received positive technical feedback from two software engineers and bar staff.

# Skills

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

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

**Tools:** Git / GitHub, MATLAB / Simulink, LabVIEW, Microsoft Office.

**Soft Skills:** Analytical thinking, Experiment design, Collaboration and teamwork, Clear and precise communication, Intellectual curiosity.

**Interests:** Machine learning, High‑performance computing, Amateur radio, Chess, Debating.