Germain D. McCaulay-Jones

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EDUCATION

University of Bath   2021 – 2025

Master of Computing in Computer Science and Mathematics with Honours (2:1)

- **Relevant Modules:** Stats for Data Science, Machine Learning, Data Structures & Algorithms, Functional Programming, Parallel Programming, Graphs & Networks, Linear & Abstract Algebra, Real & Complex Analysis, Differential & Geometric Analysis

The Warriner School   2014 – 2021

A-Levels and GCSEs

- Further Mathematics (A^*), Mathematics (A^*), Physics (A^*), Computer Science (A)
- GCSEs in 10 subjects (including English and Maths)
- Additional Mathematics (A) [**FSMQ**]

SKILLS

Languages: Python, C++, Java, TypeScript, SQL, Bash
Frameworks: Pandas, NumPy, TensorFlow, FastAPI, UnitTest, MPI
Tools: Git, GitHub, GitHub Actions, Docker, Linux/Unix (Arch), AWS, GCP, SQLite
Other Competencies: Design Patterns, Version Control, System Design, Agile, Test-Driven Development, Data Engineering Lifecycle, Relational Databases, CI/CD

PROJECTS

Quantum Cryptography Dissertation

Python, IBM Qiskit, Pandas, UnitTest, Numpy, MatPlotLib

- Extended a hybrid VQA/VQE factoriser for RSA semiprimes in **IBM Qiskit**, evaluating five cost-function encodings utilising two quantum circuits.
- Quantified NISQ sampling trade-offs via controlled shot-sweeps: for $n = \mathbf{2047}$ in a noiseless simulation, success jumped from **0.00** (1k) to **0.50** (5k), exposing a clear measurement-threshold effect.
- Built a benchmarking harness in **Python** using **UnitTest** to compare VQE variants across backends, logging experiment outputs with **Pandas** and visualising results in **MatPlotLib**.

Age Prediction Application

Python, TypeScript, Bash, TensorFlow, FastApi, Google Cloud Platform, Docker, GitHub Actions

- Engineered age-prediction on a regression model using a 5,000-image UTKFace dataset, comparing a custom CNN ($\sim$0.5M parameters) with an Xception transfer-learning model (7.3M trainable parameters), achieving **7.56** vs. **6.88** years validation MAE.
- Built a **React + TypeScript** front end with a typed API contract and automated CI via **GitHub Actions**, enabling repeatable builds/tests and consistent deployments for a smooth end-user inference workflow.
- Dockerised **TensorFlow** and **FastAPI** services and automated build-and-push to **Google Cloud Platform** with **Bash** scripts, deploying to **Cloud Run** for scalable, reproducible production serving.

HOBBIES & INTERESTS

- Self-directed study in data engineering (currently working through *Designing Data-Intensive Applications*), category theory, and quantum computing (IBM Quantum, Azure).
- Powerlifting and calisthenics, with 3 years of consistent practice.
- Reading across poetry, political theory, software development, and mathematics.
- Journaling, programming, gaming, cooking, and fashion.
- Competitive gaming, with experience as a team leader at Vulpine Esports.