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

Data Engineering: SQL, Relational Databases, Data Modelling, Data Engineering Lifecycle (generation, storage, ingestion, transformation, serving), Foundational AWS (S3, EC2, RDS, IAM)

Languages & Frameworks: Python (Pandas, NumPy, TensorFlow, FastAPI), C++ (STL, templates, MPI), Java, SQL, Bash

Tools: Git, Docker, Linux/Unix, IDEs and Editors (JetBrains, LazyVim), Linters

Software Engineering: Design Patterns, Version Control, System Design, Agile, Test-Driven Development (TDD)

Projects

Gender and Age Prediction Model | *Python, TensorFlow, NumPy, Pandas, Matplotlib, Docker, FastAPI*

- Designed and implemented an end-to-end data pipeline for facial-image data, covering data augmentation, dataset splitting, model training, and bias identification.
- Built a custom CNN for age and gender classification, incorporating ResNet-style feature extraction and evaluating performance for fairness and bias.
- Containerised a FastAPI inference service with Docker to expose the model as a reproducible local API for downstream consumers.

Quantum Computing Dissertation Project | *Python, IBM Qiskit, Numpy, Pandas*

- Developed and tested variational quantum eigensolver (VQE) algorithms to approximate ground states of Hamiltonians using Qiskit.
- Applied VQE to prime factorisation of semiprimes, exploring vulnerabilities in RSA encryption and managing experimental data and results programmatically.
- Integrated quantum backends to prototype reproducible quantum-assisted cryptanalysis workflows.

Hackathon Unity Game | *Unity, C#*

- Architected the codebase and integrated hardware sensor inputs for novel fruit-based controllers.
- Developed object-oriented gameplay systems and optimised performance in a 24-hour hackathon.
- Collaborated cross-functionally to secure 2nd place in People's Vote, showcasing rapid prototyping and teamwork.

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.