Freddie Bullard

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Education

Durham University, Durham, UK — Summer 2024

BSc Physics

- **Grade**: First Class (82%) in Year 1, Year 2 grades unreleased due to Marking and Assessment Boycott
- **Relevant Topics**: Linear Algebra, Calculus, Statistical Physics, Complex Analysis, ODEs, PDEs, Theoretical Physics, Computational Physics
- **Awards**: Durham Physics Award for Outstanding Achievement (2022)

City of London School, London, UK — Summer 2021

- **A levels**: Maths - A*, Chemistry - A*, Physics - A*

Research Interests

Interested in applying numerical and computational methods to solve scientific problems across fields.

Research Experience

Level 3 Computing Project — Autumn 2023 – Present

Department of Physics, Durham University

- Investigating solutions to classical NP-hard mathematical optimisation problems with Adiabatic Quantum Computing simulated in Python

Level 3 Advanced Laboratory — Autumn 2023 – Present

Department of Physics, Durham University

- Investigating the use of stress induced birefringence in studying the stresses and strains in complex structures under load
- Looking to apply classification algorithms to remove subjectivity in photoelasticity image analysis

Level 2 Research Led Investigation — Spring 2023

Department of Physics, Durham University

- Investigated the dark matter content of the spiral galaxy M82 through analysis of its rotation curve from HI and CO emission lines, and its luminosity as a function of distance from the galactic centre
- Applied image processing techniques with ImageJ, including as dark and bias subtraction, and flat field correction, to reduce uncertainty in our data

Professional Experience

Software Development Engineer Intern — Summer 2023

Expedia Group, London

- Worked in a team of 10, developing and maintaining the ad delivery and tracking services
- Enhanced and extended a RESTful API service to track events related to ad impressions, utilised Kotlin and Spring to implement new tracking functionalities

Software Engineer Intern — Summer 2022

Spectrum Logic, London

- Designed and implemented an image segmentation algorithm in Python to automate region-of-interest detection in low contrast, 16-bit greyscale images for their Western Blot CMOS 1:1 image scanner

Personal Projects

Brain MRI Segmentation with Deep Learning | Python, PyTorch — Summer 2023 – Present

- Applying Deep Learning to automate identification of tumour shape features in brain MRI scans
- Leveraging hypothesis testing to analyse the relationship between imaging features and genomic clusters

Noise Reduction Web App | Python — Summer 2022

- Implemented Gaussian, Median and Bilateral filters from scratch in Python with NumPy
- Developed a full-stack web application using Python with Flask, hosted on Google Cloud Platform

Online Courses

Finding Hidden Messages in DNA (Bioinformatics I) — Summer 2023
UC San Diego via Coursera

Neural Networks and Deep Learning — Summer 2023
DeepLearning.AI via Coursera

6.006 Introduction to Algorithms — Summer 2022
MIT OCW

6.0001 Introduction to Computer Science and Programming in Python — Summer 2022
MIT OCW

Technical Skills

Languages: Python, Kotlin, HTML/CSS, LaTeX
Libraries and Frameworks: PyTorch, NumPy, SciPy, Matplotlib
Other: VS Code, IntelliJ, Git, Linux, MacOS, Windows, ImageJ

References

Available upon request