

# Freddie Bullard

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## EDUCATION

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**Durham University**, Durham, UK

Summer 2025

*MPhys 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

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

## RESEARCH EXPERIENCE

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**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

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**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

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**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

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**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

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**Languages:** Python, Kotlin, HTML/CSS,  $\text{\LaTeX}$

**Libraries and Frameworks:** PyTorch, NumPy, SciPy, Matplotlib

**Other:** VS Code, IntelliJ, Git, Linux, MacOS, Windows, ImageJ

## REFERENCES

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Available upon request