

Freddie Bullard

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PERSONAL PROFILE

A motivated individual interested in applying computational and numerical methods to solve scientific problems across fields. Current Theoretical Physics undergraduate and previous Software Engineer Intern with strong mathematical and computational skills, ranked 3rd out of 227 in Year 2 and received the Module Prize for best performance in Stars and Galaxies. A keen learner, and interested in many areas of science, completed several projects and online courses related to Computer Science and Biology.

EDUCATION

Durham University , Durham, UK <i>MPhys Theoretical Physics</i> <ul style="list-style-type: none">• Grade:<ul style="list-style-type: none">- Year 2: First class, 87% - ranked 3/227- Year 1: First class, 82% - ranked 25/241• Relevant Topics: Linear Algebra, Calculus, Electromagnetism, Quantum Mechanics, Thermodynamics, Condensed Matter Physics, Stars and Galaxies, Classical Mechanics, ODEs, PDEs, Nuclear Physics, Statistical Physics, Complex Analysis, Computational Physics• Awards: Durham Physics Award for Outstanding Achievement (Year 1, Year 2), Module Award (Year 2)	Summer 2025
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RESEARCH EXPERIENCE

Level 3 Computing Project  <i>Department of Physics, Durham University</i> <ul style="list-style-type: none">• Investigating solutions to classical NP-hard mathematical optimisation problems with Adiabatic Quantum Computing simulated in Python	Autumn 2023 – Present
Level 3 Advanced Laboratory <i>Department of Physics, Durham University</i> <ul style="list-style-type: none">• Investigating the use of stress-induced birefringence in studying the stresses and strains in complex structures under load• Looking to apply analytical and machine learning methods to remove subjectivity in photoelasticity image analysis	Autumn 2023 – Present
Level 2 Research Led Investigation <i>Department of Physics, Durham University</i> <ul style="list-style-type: none">• 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, including dark and bias subtraction and flat-field corrections, to reduce uncertainty in our data	Spring 2023

PROFESSIONAL EXPERIENCE

Software Development Engineer Intern <i>Expedia Group, London</i> <ul style="list-style-type: none">• 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	Summer 2023
Software Engineer Intern <i>Spectrum Logic, London</i> <ul style="list-style-type: none">• 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	Summer 2022

PERSONAL PROJECTS

Brain MRI Segmentation with Deep Learning 🌀 Python (PyTorch)	Summer 2023 – Present
<ul style="list-style-type: none">• 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 (Flask, NumPy)	Summer 2022
<ul style="list-style-type: none">• Implemented Gaussian, Median and Bilateral filters from scratch in Python with NumPy• Improved code efficiency through vectorisation, concurrency and filter-separation• Developed a full-stack web application using Python with Flask, hosted on Google Cloud Platform	

ONLINE COURSES

Finding Hidden Messages in DNA (Bioinformatics I) <i>UC San Diego via Coursera</i>	Summer 2023
Neural Networks and Deep Learning <i>DeepLearning.AI via Coursera</i>	Summer 2023
6.006 Introduction to Algorithms <i>MIT OCW</i>	Summer 2022
6.0001 Introduction to Computer Science and Programming in Python <i>MIT OCW</i>	Summer 2022

TECHNICAL SKILLS

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

REFERENCES

Available upon request