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. A keen learner, and interested in many areas of science, completed a number of projects and online courses related to Computer Science and Biology.

Education

Durham University, Durham, UK — Summer 2025
MPhys Theoretical 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)

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

Noise Reduction Web App | Python (Flask, NumPy) — Summer 2022

- 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

Sustainable Recipe Recommendation Service | Python, SQL — Autumn 2022

- Scraped BBC GoodFoods with BeautifulSoup, building a database of recipes
- Leveraged SQLAlchemy to query the database, returning suitable recipes ranked by environmental impact
- Designed an encrypted user database, allowing users to track the impact of their meals on the environment over time
- Placed in the top 5 out of 100 teams at Durhack 2022

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, SQL
Libraries and Frameworks: NumPy, SciPy, Matplotlib, Flask
Other: VS Code, IntelliJ, Git, Linux, MacOS, Windows, ImageJ

References

Available upon request