

## **Research Interests**

My research interests lie in fusion engineering with a focus on fusion structural and plasma-facing materials, irradiation damage and the experiment characterisation of materials under reactor-relevant conditions. I am motivated by the challenge of developing and qualifying materials and joining techniques that are capable of withstanding fusion conditions. I am particularly interested in the behaviour of reduced-activation ferritic-martensitic and advanced austenitic steels under irradiation, as well as the feasibility of novel joining strategies for fusion materials.

## **Education**

**2025-2026      MSc Fusion Energy, University of York**

Relevant modules to be studied: Plasma Measurement and Data Analysis, Computational Plasma Physics, Advanced Plasma Physics for Fusion.

- Working towards an MSc in Fusion Energy, enhancing skills in data analysis and simulation methods, and gaining expertise in fusion/plasma lab diagnostics.
- Completed ICF diagnostic lab work, analysing X-ray diagnostic data recorded from a gated x-ray imager (GXI) and a streak camera (SSC), interpreting data to conclude the capsule diameter and plasma behaviour. Completed computational MCF lab work, including 0D simulations of the JET tokamak, analysing effects of ECRH and NBI on the triple product.
- Studied computational methods including using Python to solve differential equations, finite-difference discretisation of transport equations, sparse linear solves for steady-state profiles and particle-in-cell simulations.
- An upcoming research project will apply these skills to original research in fusion/plasma physics.

**2021-2024      BSc Physics, University of York**

First class honours achieved with a mark of 72% overall.

Relevant modules studied in final year: Advanced Theoretical Techniques and Modelling Matter (82%), Plasma Physics and Fusion (83%), BSc Research Project (71%)

- Developed strong foundations in advanced mathematics through the Advanced Theoretical Techniques module, gained practical experience in experimental design, data collection, statistical analysis, and formal scientific reporting through laboratory work.
- The Plasma Physics and Fusion Module provided my introduction to fusion physics, focusing on both inertial and magnetic fusion energy. This module first sparked my interest in fusion energy, and I am extremely motivated to expand my expertise in fusion energy.

BSc Research Project: *Investigating Multi-Pulse Laser Wakefield Acceleration Through Simulations*

Supervisor: *Dr Chris Murphy*

- Conducted independent computational research using EPOCH simulations of laser-plasma interactions, analysed data collected using Python.
- Developed my understanding of laser-plasma interactions, applying my research abilities to expand on earlier publications on multi-pulse behaviour. Based on this, I created and carried out a simulation campaign that was informed by existing literature.
- Conducted independent research, collaborated and shared resources with a larger group of students studying laser-plasma interactions, each with their own research focus. The project's overall score was 71%, receiving positive feedback in the viva.

**2019-2021      University Technical College, Leeds**

A Levels: Mathematics (A\*), Product Design (A\*), Physics (A), EPQ (A)

## **Employment**

**2025-Current      Fusion Energy Analyst, Fusion Advisory Services, Oxford**

- As a Fusion Energy Analyst at Fusion Advisory Services, I have researched the fusion energy sector to provide insights for governments, investors, and industry leaders.
- I have contributed to reports on the private fusion sector, key technologies, and company due diligence reports.
- Completing work with an expert team, drawing on their years of fusion expertise to deepen my sector knowledge, while conducting literature and patent reviews with an analytical eye to support due diligence reports.
- I collaborate in an agile, team-based environment to regularly deliver high quality reports under short deadlines.

**2024-2025 Graduate Cryptography Analyst, HSBC, Sheffield**

- Worked under the technical director's office for global cryptography, primarily as a business analyst handling confidential cryptographic information.
- Engaged with stakeholders, interpreting complex information about governance and processes, as well as working in a project team delivering a global inventory for the hardware used in cryptography. The project team worked in an agile manner with sprint planning and Jira utilisation.
- I utilised HSBC's internal AI tools to assist in my role, mainly to analyse documents, and built strong skills in presenting information/data utilising tools such as Visio, PowerBI and Excel.

**August 2022 Academic Excellence Scholarship, Research Internship, University of York**

- Developed skills in Linux and MATLAB, utilising the University of York's supercomputer Viking, running simulations to investigate laser wakefield acceleration, specifically plasma density ramps. Worked in a small group of four students, each working on different areas and supporting each other.
- Performed laser-plasma interaction simulations using the EPOCH particle-in-cell code in a Linux environment and analysed simulation outputs in MATLAB.
- At the end of the placement, a short presentation was delivered to the head of the placement Dr Chris Murphy.

**2021-2024 Catering Assistant, WP Browns, York**

- Part-time role alongside studies, starting as a pot washer, worked up to being trained as a cook in the kitchen and trained as a barista. I worked in a small team dealing with large amounts of customers in York, delivering a great experience under large amounts of pressure and being able to work on multiple tasks at once.

**Skills**

- Python, MATLAB, Linux/Unix
- Data analysis, simulations, and computational modelling
- Experimental design and scientific reporting
- Agile teamwork, project delivery under tight deadlines, mentoring/leadership
- Microsoft Office (Excel, Word, PowerPoint, Visio)

**Interests**

- Held two student support roles at the University of York during my degree, volunteering as a student buddy to help new students settle into university life and assist them in any way I could and worked as a Peer Assisted Learning Leader, running sessions for undergraduates helping them to work together and assisting them with their course problems.
- Joined as a member of the Institute of Physics after my undergraduate degree, I follow the latest developments in physics, from fusion energy to quantum technologies. I enjoy engaging with new research and reading about their implications for the physics community.

**References**

- Available upon request.