

# Reuben Gallagher

Junior Research Associate

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MSci Physics graduate from the University of Birmingham with research experience in thin film photovoltaics and materials characterisation. Co-author on a paper in the Journal of Materials Chemistry A. Skilled in XRD, SEM, AFM, and spectroscopic ellipsometry. Completed a summer placement at the Rutherford Appleton Laboratory working on neutron scattering experiments.

## Experience

**Summer Research Intern**, Rutherford Appleton Laboratory (STFC), Didcot

Jun 2024 – Aug 2024

Joined the ISIS Neutron and Muon Source facility for a 10 week research placement in the Crystallography Group.

- Collected and processed neutron diffraction data from **35 crystalline samples** using the WISH diffractometer
- Wrote Python scripts to automate Rietveld refinement workflows, reducing processing time from **4 hours to 45 minutes** per dataset
- Presented findings to a group of **18 researchers and facility staff** at the end of placement seminar

**Undergraduate Research Assistant**, University of Birmingham, Centre for Energy Storage, Birmingham

Oct 2023 – Jun 2025

Part time research assistant alongside MSci studies, working on perovskite solar cell fabrication and characterisation.

- Fabricated and characterised **260+ perovskite thin film samples** using spin coating, thermal evaporation, and XRD
- Operated SEM, AFM, and spectroscopic ellipsometry to measure film thickness, surface roughness, and crystallinity across **8 deposition parameter sets**
- Contributed to data analysis for a paper published in the **Journal of Materials Chemistry A** (DOI: 10.1039/D5TA02847K)

**Physics Lab Demonstrator**, University of Birmingham, Birmingham

Oct 2023 – Apr 2024

Supervised first year physics practical sessions for groups of 20 students.

- Demonstrated optics, electronics, and mechanics experiments across **36 sessions**
- Marked **100+ lab reports** per term with detailed written feedback

## Education

**MSci (Hons) in Physics**, University of Birmingham, Birmingham

Sep 2021 – Jun 2025

First Class Honours. Masters project on *Optimising Methylammonium Lead Iodide Perovskite Thin Films for Photovoltaic Applications*. Modules include condensed matter physics, quantum mechanics, and computational physics.

## Skills

XRD (Bruker D8 Advance) • SEM & AFM • Spectroscopic Ellipsometry • Spin Coating & Thermal Evaporation • Python (NumPy, SciPy, Matplotlib) • MATLAB • OriginPro • LaTeX • Data Analysis & Error Propagation • Cleanroom Protocols (ISO Class 5)

## Certifications

**Institute of Physics (IOP) Associate Member**, Institute of Physics

Sep 2023

## Languages

English (native)

## Projects

**MSci Research Project: Perovskite Thin Film Optimisation**

Sep 2024 – May 2025

Investigated the effect of annealing temperature and precursor concentration on perovskite thin film quality for solar cell applications.

- Fabricated **120 samples** across 8 parameter sets and characterised each with XRD, SEM, and UV-Vis absorption
- Identified an annealing protocol that improved power conversion efficiency by **1.8 percentage points** compared to the baseline
- Findings contributed to a co-authored paper in the **Journal of Materials Chemistry A**

**Neutron Diffraction Analysis (STFC Summer Project)**

Jun 2024 – Aug 2024

Automated neutron diffraction data processing for the ISIS WISH beamline.

- Built Python scripts that reduced Rietveld refinement time by **82%**
- Processed data from **35 samples** for ongoing structural studies of magnetic materials

## References

**Dr. Katherine Sherwood**

Senior Lecturer in Condensed Matter Physics, University of Birmingham, k.sherwood@bham.ac.uk, +44 7700 900 671

**Dr. Thomas Finch**

Instrument Scientist, WISH Beamline, STFC Rutherford Appleton Laboratory, thomas.finch@stfc.ac.uk, +44 7700 900 829

## **Extra Curricular Activity**

**President, University of Birmingham Physics Society**

*Sep 2023 – Jun 2024*

Led a committee of 8 to organise 12 talks, 2 lab tours (Diamond Light Source and JET), and a careers fair attended by 150+ students.