

**Exciting [Faraday Undergraduate Summer Experience \(FUSE\)](#) paid internship opportunities for summer 2022.**

Studying a STEM degree? Wondering what career to pursue? Interested in finding out more about the battery sector? Keen to spend time with a dynamic community of pioneering battery researchers seeking to find solutions to support a fully electric future?

The Faraday Institution is offering a total of 56 internships, for undergraduate students to spend 8 weeks working on battery related projects.

**Project title:** *Process Analysis for UK LFP Manufacturing*

**Project description:**

As part of the transition to battery electric vehicles, there has been a recent increase in demand for LFP (lithium iron phosphate) battery production. As a cheap and abundant material, recent technological developments have greatly increased the performance of this material, making it more competitive with market leading high Ni materials. As the cathode typically accounts for 50% of the total battery cost, cathodes which offer lower costs whilst maintaining or increasing performance, such as LFP, have a significant competitive advantage when scaling up the manufacturing process. The key to harnessing such developments lies in scalable manufacturing processes with optimized materials performance. This project will develop block flow diagrams to compare detailed stage-by-stage process conditions for the established commercial LFP synthesis routes such as solid-state and sol-gel and compare these with experimental routes that include solvothermal, hydrothermal and microwave. In each case, specifying reaction mechanisms, while comparing different alternative raw material sources and their respective cost. This work will be conducted alongside our industrial partner Exawatt which specialises in economic forecasting of technologies. A process model will then be developed for at least 1 manufacturing process, creating a methodology to underpin techno-economic analysis of the entire process.

- Identify the several competing manufacturing routes for LFP CAM production
- Detail the reaction mechanism and conditions for each process in a process flow diagram
- Define the different raw materials alongside their costs that can be used in each process
- Develop an Aspen Plus model for at least 1 of the commercial processes

**Supervisor:** Dr Usama Mohamed

**University:** The University of Sheffield

**Location:** Hybrid or remote

**Start date:** The internship is a full-time role for 8 weeks, flexible start date from mid-June.

**Eligibility:**

- Be registered full-time undergraduate student from a UK university.
- Undertake the internship within the years of their undergraduate study (i.e., not in final year or during a subsequent Masters' programme).
- Not have been a FUSE intern in a previous year

### Funding:

A salary of £9.90 / hour across the UK or £11.05 / hour in London will be provided. This will be determined by the working address of the appointee, not the university's location. The funding is provided by the [Faraday Institution](#).

### Additional activities:

During the FUSE internship you will be able to attend Faraday Masterclasses and cohort events which will focus on a variety of topics to further develop your understanding of career opportunities in battery sector. At the end of the programme, you will be invited to to share a poster about your work and prizes will be awarded.

### Application:

In order to apply for a Faraday Undergraduate Summer Experience (FUSE) 2022 internship, you need to be an undergraduate in a STEM degree (preferably Chemical Engineering, Process Engineering, Chemistry, Material Science, etc.) with an interest in the battery industry and its competing technologies. Additionally, ability to understand chemical reaction mechanisms and developing process flow diagrams of different synthetic routes is essential for this project. Finally, having a general understanding of Aspen Plus process modelling would be advantageous. **The deadline for submitting your application is the 15<sup>th</sup> of April.**

Please send in your application by completing the form via the link provided or by scanning the QR code below: <https://www.surveymonkey.co.uk/r/Exawatt>



### Diversity

The Faraday Institution is committed to creating a dynamic and diverse pool of talent for the fields of battery technology and energy storage.

*The University of Sheffield is an Equal Opportunity Employer. The following statement, relating to staff, has been approved by the University Council:*

*The University of Sheffield, in accordance with the general intention of its Charter, confirms its commitment to a comprehensive policy of equal opportunities in employment in which individuals are selected and treated on the basis of their relevant merits and abilities and are given Equal Opportunities within the University.*

*The aim of this policy is to ensure that no job applicant or employee should receive less favourable treatment on any grounds not relevant to good employment practice. The University is committed to a programme of action to make this policy fully effective.*

*It is the University's policy as an employer to treat all people with dignity and respect, equally irrespective of any of the protected characteristics as defined by the Equality Act 2010. The protected characteristics are*

- *age*
- *disability including mental health*
- *gender re-assignment*
- *marriage and civil partnership*
- *pregnancy and maternity*
- *race*
- *religion or belief*
- *sex and sexual orientation*

*The University will not tolerate discrimination against employees on any of these grounds. The University's policy on the recruitment and employment of ex-offenders will also be taken into account.*