

**Exciting [Faraday Undergraduate Summer Experience \(FUSE\)](#) paid internship opportunities for summer 2023.**

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 55 internships, for undergraduate students to spend 8-weeks working on battery related projects.

**Project title:** Crystallographic & spectroscopic studies of highly delithiated  $\text{Li}_x\text{NiO}_2$  cathodes

**Project description:**

Rapid adoption of Ni-rich layered oxide cathodes in real cell formats is critical to improve the energy density of Li-ion batteries. However, the desired higher energy densities are only accessible through high voltage operation which leads to pronounced, often harmful, changes in the cathode. To suppress these changes, the first step is to understand how the cathode structure changes at such high voltages and extreme states of delithiation. Unfortunately, these changes are often oversimplified into a singular phase transition (H2 to H3), overlooking other critical factors like Ni migration, and stacking fault formation. Understanding this helps to devise strategies to close the gap between theoretical and practical capacities of Ni-rich cathodes.

This internship utilizes the novel X-ray diffraction (XRD) and absorption spectroscopy (XAS) facilities at the Uni. Of Warwick to systematically investigate the bulk structural changes in  $\text{LiNiO}_2$  as a function of voltage and extent of delithiation. The primary tasks of the intern will involve (1) Sample preparation: Coin cell building and cycling of FutureCat-synthesised  $\text{LiNiO}_2$  cathodes and, (2) Characterisation: Post-mortem X-ray diffraction and absorption spectroscopy measurements on the cycled cathodes. They will also actively participate in the electrochemical and X-ray data analysis to develop accurate structure models of delithiated  $\text{LiNiO}_2$  phases.

**Supervisors:** Dr Ashok S. Menon & Prof Louis Piper

**University:** University of Warwick

**Location:** In-person

**Start date:** The internship is a full-time role for 8 weeks between from June – September 2023

**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 £10.90/ hour across the UK or £11.95 / 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 Institution 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 share a poster about your work and prizes will be awarded.

**Application:**

In order to apply for a Faraday Undergraduate Summer Experience (FUSE) 2023 internship, you need to fill in the Survey Monkey form via this link <https://www.surveymonkey.co.uk/r/WMGFUSE23> or the QR code below by 31st March. Interviews will be online and are expected to take place 27th-28th April.



**Diversity**

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

Details about the University of Warwick EDI policies can be found in the two links below:

1. [Diversity and Inclusion \(warwick.ac.uk\)](https://warwick.ac.uk)
2. [Social Inclusion Group \(warwick.ac.uk\)](https://warwick.ac.uk)