

## **Exciting Faraday Undergraduate Summer Experience (FUSE) paid internship opportunities for summer 2026.**

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

### **Project title: The impact of heteroatom doping in hard carbon for sustainable Sodium-ion batteries**

#### **Project description:**

Sodium-ion batteries (SIBs) are a promising successor of Lithium-ion batteries (LIBs) mainly due to the high abundance of sodium, the using of cheaper aluminium current collectors as well as their possibility to use biomass as anode material. While a wide range of cathode materials have been explored and adapted from LIBs, the anode remains a critical bottleneck. Hard carbons (HC) are the leading anode materials due to their good capacity, cyclability and low-cost especially when synthesised from various biomasses such as coconut shells, rice husks or avocado skin. HCs are primarily composed of disordered structures with randomly oriented graphitic domains, increased interlayer spacing and residual heteroatom. However, they still suffer from drawbacks such as a lower specific capacity, lower energy density and a poorer cycling performance. To overcome these limitations research has focused on developing optimization strategies that can enhance the performance, one promising strategy is heteroatom doping. Introducing dopants can significantly improve electrochemical properties by enhancing electronic conductivity, surface wettability, and electrode-electrolyte interactions. Examples include substitutional dopants such as nitrogen and boron that replace the carbon atoms in the lattice, or interstitial dopants such as sulphur and phosphorus which are introduced into the interlayer spaces. In this project, we will use glucose as a sustainable precursor to synthesise hard carbons via a 2-step synthesis including a hydrothermal treatment and a subsequent carbonisation at high temperatures. This project builds on our ongoing work in looking into the modification on HC via the implementation of heteroatoms such as sulphur, phosphorous and nitrogen using different precursor. We will investigate the impact of these modified carbons onto the sodium storage implementing materials characterisations like XPS and electrochemical testing.

**Supervisor:** Marie-Louis Reich

**University:** Imperial College London

**Location:** In-person at the Department of Chemical Engineering, Imperial College London

**Start date:** The internship is a full-time role for 8 weeks during June-September. Start date is flexible, to be agreed with the project lead.

#### **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 **£14.80/hour** will be provided. 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) 2026 internship, please send your CV to Marie-Louis Reich (m.reich24@imperial.ac.uk) with 'FUSE – Heteroatom Doping' as the subject and fill in the survey found here: <https://forms.office.com/e/fCxdqciDhG>. The deadline for applications is 27<sup>th</sup> April 2025.

**Diversity**

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

You can read more about Imperial's commitment to Equality, Diversity and Inclusion here: <https://www.imperial.ac.uk/equality/>