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: Leveraging Physics-Informed Neural Networks (PINNs) for Non-Invasive Battery Parameter Estimation

Project Description:

Accurate battery modelling is essential for improving performance and extending the lifespan of lithium-ion batteries. While physics-based models offer deep insights into internal cell dynamics, they rely on dozens of physical parameters (e.g., solid-state diffusivity, reaction rate constants) that are difficult to measure experimentally and often evolve as the battery degrades. Traditional methods for extracting these parameters require expensive, destructive testing or computationally heavy optimization routines.

This project aims to solve this *inverse problem* by utilizing Physics-Informed Neural Networks (PINNs). Unlike traditional black-box machine learning that relies solely on data, PINNs embed the physical laws governing battery behaviour (such as mass and charge conservation equations) directly into the network's loss function.

You will:

- **Develop a strong theoretical understanding** of electrochemical battery dynamics and standard physics-based models (such as the Single Particle Model or P2D model).
- **Design and implement Physics-Informed Neural Networks** using libraries like PyTorch, learning how to embed differential equations into machine learning training loops.
- **Demonstrate PINN's inverse-solving capability** by training models to extract inaccessible physical parameters and internal states (e.g., State of Charge) from synthetic and experimental time-series data of measurable variables (e.g., current, voltage, temperature).
- **Validate your results** by comparing your PINN estimations against established benchmarks or high-fidelity simulations from open-source tools like PyBaMM.

Desirable skills and experience:

- Have interest in Lithium-ion Battery modelling
- Proficient in Python, PyTorch, and version control
- Awareness of scientific machine learning

Supervisor: Dr Monica Marinescu (Associate Professor), Dr Matei Ignuta-Ciuncanu (Postdoctoral researcher), Dr Bohan Peng (Postdoctoral researcher)

University: Imperial College London

Location: In person, South Kensington Campus

Duration: This internship is full-time for 8 weeks during June – 28th August 2026

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 up to £11.44/hour across the UK or up to £13.15/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:

- Please apply to the internship via this link.
- **Applications will close on April 26th and interviews will be held until 4th May.**

*Please also complete the short **Faraday Institution survey** that would allow the organisation to keep you updated about relevant webinars this summer and future careers opportunities in the battery sector.*

Diversity:

The Faraday Institution is committed to creating a dynamic and diverse pool of talent for the fields of battery technology and energy storage. Tackling the global challenges of the future, such as climate change, will require a truly diverse, creative approach. For Imperial to be at the forefront of this effort, we will need to draw upon the talents of staff and students who come here from all backgrounds and from all over the world.

You can read Imperial College's full Equality, Diversity and Inclusion strategy here.