

Project title: Anode-free cross talk: determining capacity losses at the anode with cathode cross-talk products

Project description: This project is about understanding fundamental chemical processes occurring in anode-free lithium batteries. These batteries do not have a fabricated anode (typically graphite or metallic lithium), instead the anode is formed when the battery is first charged from lithium ions in the cathode.

These anode-free batteries are a significant advance in energy density compared to lithium ion batteries with anodes, that is, compared to graphite anode cells, the energy density is 40% less. This means vehicles could be lighter or have improved drive ranges.

However, these cells are at an early stage of development, and only last about 200 cycles, compared to the 1000s expected for commercial application. Issues related to their short-lifetime are chemical degradation, and in this project, you will explore different chemical for possible influence of cell stability.

At the start of the internship, we will have a meeting to discuss the motivation for the science and plan the following 8 weeks of work. You will work closely with another internship student on a similar but separate project. You will be invited to regular group meetings and be invited to present your work.

Skills you will learn through discussions and hands-on lab work:

- Basic knowledge about batteries
- Knowledge of advanced battery technology
- Use of a glovebox
- How to safely assemble coin cell batteries
- How to plan, coordinate and analysis experimental data
- Plotting data (Python/Origin Lab) and data interpretation
- Presentation skills/poster design

Supervisor: Dr Bethan Davies, Research Associate, in the Interfacial Electrochemistry group of Prof. Ifan Stephens.

University: Imperial

Location: in person primarily based at Imperial's White City campus but also some experiments might be undertaken at the South Kensington campus – there is a shuttle bus to transport students and staff between these campuses.

Start date: The internship is a full-time role for 8 weeks starting from June/July (start date to be confirmed with consideration for the student).

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 £450/week. Total for 8 weeks is £3600. This is the maximum, capped by Imperial for students carrying out their FUSE or other UROP. 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 complete this survey: https://imperial.eu.qualtrics.com/jfe/form/SV_0vS3yJ7vgJEjPgy

Please also complete the Faraday Institution [survey](#) so you can be kept up to date about other Faraday opportunities.

Diversity

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