

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

Conductivity of novel electrolytes for sodium ion batteries using molecular simulations and experiments

Project description

Sodium ion batteries have the potential to become an important complementary technology to conventional lithium batteries, with significantly lower cost and environmental impact. Improving the conductivity of the liquid electrolyte that facilitates ion transport between electrodes is crucial to realise this objective. The intern will join an ongoing experimental/theoretical project to explain differences in conductivity between several novel sodium borate salts recently developed in the Wright and Grey groups. Initially, they will perform equilibrium and enhanced sampling molecular simulations, following a previously established protocol, and analyse them using statistical mechanical theory to interpret transport properties in terms of the molecular geometry and interaction potential.

Depending on these initial results, and the interests of the intern, there is scope for the intern to test their results using pulsed-field-gradient NMR and impedance spectroscopy experiments. Alternatively, they could use more sophisticated simulations to predict alternative solvent combinations that might further improve the conductivity of these novel electrolytes. Time permitting, we will advance our calculations further by developing efficient machine-learned forcefields to describe the molecular interactions with quantum-mechanical accuracy.

The intern will gain considerable domain knowledge of the challenges in electrolyte design for battery optimisation, as well as multiple techniques to resolve these challenges. They will gain experience in scientific computing and data analysis using liquid-state theory. The team they will join is small and flexible, which will allow the project to be tailored to the intern's interests but is part of a much larger research group so there is plenty of scope to learn new techniques and to experience effective collaboration between experiment and theory.

Supervisor Dr Sam Niblett, in the group of Prof Dame Clare Grey

University University of Cambridge

Location Cambridge, in-person preferred but remote working possible at intern's request.

Start date The internship is a full-time role for eight weeks, ideally running 19/6-11/8 or 27/6-18/8. Other start dates may be possible at the intern's request.

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

To apply, please complete this [survey](#) by 23.59 on 17 April 2023.

For project information, please visit <https://faraday.ac.uk/research/lithium-ion/extending-battery-life/>

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 Cambridge is committed in its pursuit of academic excellence to equality of opportunity and to a pro-active and inclusive approach to equality, which supports and encourages all under-represented groups, promotes an inclusive culture, and values diversity.