

**Exploring the Application of Acoustic Techniques to Improve Battery Safety and Performance**

**Project Description**

Ensuring battery safety is one of the most important factors when developing systems for electric vehicles. To ensure the safe operation of batteries, diagnostic techniques can be deployed, to track the behaviour and provide a fingerprint of the current state of health of a system. These techniques can include thermal and electrical characterisation, however over the last few years acoustic tools have increasingly been deployed. Acoustic spectroscopy enables scientists to listen to the processes, which occur in a battery during operation and identify abnormal behaviour, which can predict the early degradation or ultimately the failure of a cell. The FUSE intern, supported by researchers at UCL, will support existing research attempting to develop a comprehensive understanding of the ‘sound of batteries’. The intern will track the characteristic response of a battery during operation and correlate the signal with key markers in the electrochemical response of a cell. In doing this the intern will be contributing to a better understanding of the ‘Science of Safety’ and improving the fundamental understanding which is required to avoid battery failure. While not a requirement some experience working with coding is desirable for the position.

**Project Goals**

Join the Faraday Undergraduate Summer Experience (FUSE) internship programme and learn more about the development of the ‘Science of Safety’ and battery diagnostics which will help in the development of a career in the field of battery technology and energy storage. In conducting the project:

* You will be working with a leading research group to develop the tools to allow for safer operation of battery systems.
* You will gain exposure to the methods used across the SAFEBATT research programme to develop the Science of Safety and improve current systems.
* You will become familiar with the electrochemical and acoustic behaviour of Li-ion batteries.
* You will develop your analytical skills to relate different processes to the performance of batteries.
* You will develop skills using other experimental methods such as X-ray and Microscopy techniques.
* You will begin to develop a model to illustrate the propagation of waves through Li-ion batteries.
* You will correlate the prediction of the computational model to the experimental results.
* You will develop your presentation and reporting skills and enter a poster competition based on your research.

**Eligibility**

In order to partake in the project you must be:

* A full-time registered undergraduate student at a UK university.
* Undertake the internship within the years of undergraduate study (i.e., not be currently in your final year).
* Not have been a FUSE intern in a previous year.

**It is our intention to run this as an in-person project subject to the prevailing conditions at the beginning of the project therefore the appointee must be available in London during the project.**

**Funding**

A salary of £11.95 will be provided. The funding is provided by the [Faraday Institution](https://www.faraday.ac.uk/).

**Additional activities**

During the FUSE internship you will be able to attend Faraday Masterclasses and 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

to share a poster about your work and prizes will be awarded.

**Application**

In order to apply for a Faraday Undergraduate Summer Experience (FUSE) 2022 internship, please complete the following [SURVEY](https://forms.office.com/e/dkMskbJqf1) and send your CV to [j.b.robinson@ucl.ac.uk](mailto:j.b.robinson@ucl.ac.uk) by April 21st 2023 with ‘SAFEBATT FUSE Application’ in the subject bar.

**Diversity**

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

At UCL, as London’s Global University, we know diversity fosters creativity and innovation, and we want our community to represent the diversity of the world’s talent. We are committed to equality of opportunity, to being fair and inclusive, and to being a place where we all belong.

We therefore particularly encourage applications from candidates who are likely to be underrepresented in UCL’s workforce.

You can read more about our commitment to Equality, Diversity and Inclusion here : <https://www.ucl.ac.uk/equality-diversity-inclusion/>

**Deadline**

April 21st 2023