Identifying the key factors in battery pack balancing through experimentation and simulation

Project Description

Previous work has identified a tendency for battery cells to self-balance in ascending voltage order, and that degradation and inhomogeneity affect the rate of balance. However, the cause of these effects has yet to be identified.

Battery pack balancing is theoretically used to increase battery performance and decrease degradation. Research has been carried out, both experimentally and in modelling, but questions remain over what balancing strategy is best and the causes of imbalance.

The aim of this project is to build battery pack models and carry out experimentation to better understand battery pack balancing, the effects on battery performance, and identify the causes of observed effects relating to state of balance.

This project will take place within the ESE group at Imperial College London as part of the MSM Faraday Project and will be supported by IONETIC, who will provide industry insights, battery models, and battery packs for testing.

Objectives:

- Work in a leading battery research group, gaining experience in modelling and experimentation
- Build battery models to test hypotheses and validate experimental data provide and generated
- Learn how to test battery packs, design experiments, and analyse large datasets

Supervisor: Monica Marinescu, James Eaton

University: Imperial College London

Location: In Person – Imperial College London, South Kensington Campus

Start date: The internship is a full-time role for 8 weeks; within June – September 2023

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

Experience

Ideally:

- You have experience with batteries, experimentally, academically, or otherwise
- You have experience using Simulink

Essential:

- You have experience with a data processing language such as Python or MATLAB

Funding

A salary of £400/week will be provided. The internship is a full-time role for a period of 8 weeks between June and September. The funding is provided by the Faraday Institution.

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

Application

In order to apply for a Faraday Undergraduate Summer Experience (FUSE) 2023 internship, please fill out this form: https://forms.office.com/e/ci08YPbs2p

The application deadline is April 9th at 23:59.

Diversity

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

Terms and Conditions

By applying to this position, you agree that Imperial College London, IONETIC, and the Faraday Institution can share information about you, such as your name, contact details, and personal information, with each other for the purpose of carrying out the Faraday Institution Summer Experience 2022.