



THE FARADAY
INSTITUTION

MULTI-SCALE MODELLING

Modelling

Safety & thermal management in commercial EV batteries

Project Description

With the rapidly growing market for lithium-ion batteries (LIBs) in electric vehicles and home storage, safety is an important aspect to monitor. Apart from the obvious need for protection of human life, there is a risk to the industry and the transition to clean transport, as any safety incidents occurring in EVs would reflect poorly on the technology and may trigger a public backlash against it. This would be catastrophic for transitioning the energy and transport sectors to clean technology and render them much harder to decarbonise. However, the costs of applying safety systems to battery packs needs to be considered too. The student will review the safety aspects, strongly linked to thermal management, of commercial battery packs, identifying and comparing key strategies and associated costs.

Project Objectives

- Go through the data in the commercial database, to see what sort of information is available and how relevant it is to safety.
- Put the data into a suitable spreadsheet for comparison and further analysis.
- Draw comparisons and conclusions from the data, to compare the efficacy and cost of commercial safety strategies.

Learning Objectives

- Understanding of the working principle of batteries and applications.
- Obtaining insights into battery pack design for safety, associated challenges and key solutions.
- Development of techno-economic models tailored towards engineering problems .

Funding

A salary of £9.50/hour across the UK or £10.85/hour in London will be provided. This will be determined by the working address of the appointee, not the university's location. The internship is a full-time role for 8 weeks beginning in June-early July. The funding is provided by [The Faraday Institution](#).

Eligibility

In order to be eligible for the Faraday Institution's FUSE funding, you will need to:

- Be a fully registered student at a UK university; and
- Not be in your final year of undergraduate study.

This project can be executed entirely remotely.

To apply:

Please send your CV and a brief cover letter to j.edge@imperial.ac.uk by **30th April 2021**.

The criteria for selection will be:

Essential: a clear rationale for applying for the position and how it fits with the candidate's career goals.

Essential: evidence of interest and motivation for the research area.

Essential: familiarity with Excel spreadsheets.

Essential: ability to document work done and flexibility to discuss slides on ongoing results of the project with the supervisor weekly and update the supervisor promptly on any challenges faced.

Desirable: some experience in a high level programming language, preferably Python or MATLAB.

Imperial College London is committed to providing a supportive and considerate community, based on diversity, mutual respect and a commitment to excellence. Imperial College London was a founder member of the Athena Swan Charter, which recognises and celebrates good employment practice undertaken to address gender equality in higher education and research. Imperial College London received the institutional Silver award in 2012 and the Department of Mechanical Engineering at Imperial College London was recently awarded an Athena Swan Bronze Award.