



THE FARADAY  
INSTITUTION

MULTI-SCALE MODELLING

# Modelling

## High level analysis of demonstration & grid scale projects using batteries & storage

### Project Description

The US DoE maintains a database of all of the demonstration & grid scale projects in energy storage around the world. There is a lot of useful data in here that can be presented in a creative way, to show the status of grid-scale battery projects and how batteries compare to other energy storage technologies, in terms of energy and power scales, costs, suitability for specific services, etc. The student will download and process the data in a repeatable way (i.e. so that updates to the database can be easily retrieved and reprocessed) and then present a range of charts or figures to showcase how batteries are being used for grid scale applications and how their development in this area is progressing, in comparison with other technologies. The database can be downloaded as an excel, but the ideal student for this role would have some experience in MATLAB or python and be able to write code to extract useful information from this excel.

### Project Objectives

- Download the data (Excel spreadsheet) from the US DoE website.
- Develop code to read in the data, remove duplicates, filter out records with insufficient data, recategorise technology types and perform basic data cleaning.
- Supplement data with data from the literature or press releases, as appropriate.
- The code should also perform basic calculations, such as determining the maxima, minima and total values of particular columns.
- Plot the data in a suitable form for analysis and to illustrate the key aspects of battery projects around the world.
- Test your code by redownloading the updated database and ensuring that it still works as expected.

### Learning Objectives

- Understanding of the range of energy storage technologies and their applications in grid support.
- Overview of the demonstration and grid-scale energy storage projects around the world.
- Obtaining insights into the application of batteries and other ES technologies to provide specific grid needs.
- Development of simple code and creative data visualisation techniques.

### 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](mailto:j.edge@imperial.ac.uk) by **30<sup>th</sup> 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:** some experience in a high level programming language, preferably Python or MATLAB.

**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.

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.