



Job Description

Post-Doctoral Researcher in Open Source Energy System Modelling
School of Mechanical & Manufacturing Engineering
Dublin City University
Fixed Term Contract up to 36 Months

Dublin City University www.dcu.ie is a young, ambitious and vibrant University, with a mission ‘to transform lives and societies through education, research, innovation and engagement’. Known as Ireland’s ‘University of Enterprise and Transformation’, it is committed to the development of talent, and the discovery and translation of knowledge that advances society and the economy. DCU is the Sunday Times Irish University of the Year 2021.

The University is based on three academic campuses in the Glasnevin-Drumcondra region of north Dublin. It currently has more than 18,000 students enrolled across five faculties – Science and Health, DCU Business School, Computing and Engineering, Humanities and Social Sciences and DCU Institute of Education. DCU is committed to excellence across all its activities. This is demonstrated by its world-class research initiatives, its cutting-edge approach to teaching and learning, its focus on creating a transformative student experience, and its positive social and economic impact. This exceptional commitment on the part of its staff and students has led to DCU’s ranking among the top 2% of universities globally. It also consistently features in the world’s Top 100 Young Universities (currently in QS Top 70 Under 50, Times Higher Top 150 Under 100).

DCU is placed 84th in the world, in the Times Higher Education University Impact Rankings – measuring higher education institutions’ contributions towards the UN Sustainable Development Goals. Over the past decade, DCU has also been the leading Irish university in the area of technology transfer, as reflected by licensing of intellectual property.

School of Mechanical and Manufacturing Engineering

The School of Mechanical and Manufacturing Engineering has been at the forefront of Teaching, Learning, Research and Innovation in engineering since its establishment in 1987. Current programmes include Mechanical and Manufacturing Engineering, Biomedical Engineering and Mechatronics. The School is a research-intensive school that is home to key researchers affiliate to the research centres listed above and also to ESIPP, MEDeng and the Water Institute, and has particular strengths in Biomedical Engineering, Advanced Manufacturing and Sustainable Systems and Energy. At postgraduate levels the school offers taught Master’s programmes with Majors in Sustainable Systems and Energy.

HyLight Project and Role Profile

Ireland has a commitment to climate action and whole system decarbonisation to advance the global objectives on climate change agreed under the Paris Agreement and has committed to law to decarbonise our economy by >50% by 2030.

HyLIGHT is a 3-year project funded by [Science Foundation Ireland \(SFI\)](#) and a 25-strong industry consortium through [MaREI](#) the SFI Research Centre for Energy, Climate and Marine, [UCC](#), [DCU](#) & [NUIG](#). The overall aim of HyLIGHT is to provide the knowledge, data and the necessary tools to guide the cost-effective decarbonisation and roadmap sustainable large-scale implementation of hydrogen technologies in Ireland to enable sector integration for a zero-carbon, secure, resilient energy system. HyLIGHT will achieve its aim by collaborating with the leading national and international companies, universities and stakeholders working to facilitate the delivery of hydrogen to all energy sectors; heat, transport and electricity; but also to where it is needed in industry, in a safe and cost effective manner for energy consumers and industry. Over its 3-year timeline, HyLIGHT has four objectives: Vision, Roadmap, Plan and Partnership. The first three each contribute a project milestone. The fourth facilitates partnership in optional investment opportunities, facilitated by the network and knowledge gained that may build into independent projects outside this project.

The project team is now seeking to recruit a **Post-Doctoral Researcher** which role will help develop a conscious decarbonisation strategy for the island of Ireland for achieving 2050 targets, and working back to today, will identify key actions that can unequivocally lead to the intended targets. The model will be built in the environment initially developed by DCU through an SEAI-funded project, using Python, Jupyter, open source platforms and PyPsa. It will model energy use, energy storage (at grid scale TWhrs) and decarbonisation pathways.

As part of this role the Researcher will be required to participate in the **DCU Research Career Framework**. This framework is designed to provide significant professional development opportunities to Researchers and offer the best opportunities in terms of a wider career path.

Principal Duties and Responsibilities

Reporting to the Principal Investigator, the **Post-Doctoral Researcher** will:

- Liaise with industry partners and own network and global networks to gather knowledge or insights
- Expand DCU's existing open source resource library for energy system modelling
- Expand DCU's open source python based Open Energy System Model for Ireland (OESM-IE) & test & validate
- Develop a variety of scenario system configurations showing deep decarbonisation (nett negative CO₂ emissions) and specifically investigating the role of large scale energy storage & hydrogen
- Characterise deep-decarbonisation transformation pathways from the current system configuration to such nett negative CO₂ configurations, consistent with an equitable cumulative CO₂ quota, aligned with the Paris Agreement
- Develop itinerary / database of infrastructure obstacles, risks and bottlenecks to the above scenarios
- Develop proposed required enablers and solutions to obstacles modelled
- Carry out sensitivity testing and alternate scenarios

- Directly engage with international, government & economic stakeholders and develop key relationships to progress work-package tasks
- Circulate findings and collaborate into other work-packages
- Analysing and summarise key characteristics arising from own work
- Present relevant, tailored, communications to all target audiences for the project's results
- Prepare reports and papers to publish in high impact open source journals.

Additionally, the **Post-Doctoral Researcher** will undertake the following general duties and responsibilities:

- Produce expert working paper(s), reports and policy briefing material
- Participate in general NUIG & DCU MaREI Centre activities, including industry showcases, annual reviews and industry and agency visits to the Insight labs
- Carry out administrative work associated with the programme of research as necessary
- Carry out other tasks relevant to successfully implementing the assigned HyLight project.

Qualifications and Experience

Minimum Criteria

- PhD in Mechanical Engineering or similar area with thesis relevant to the HyLight project
- Expertise in use of engineering modelling software in energy applications, e.g., Excel, Matlab, Python, Jupyter, C++, Fortran, open source platforms, PyPsa
- Excellent written and oral English
- Excellent social skills.

In addition, it is desirable that the candidate has a subset of the following skills and experience:

- Database management technologies, e.g. MySQL
- Experience in research grant writing, student supervision, project management
- Postdoctoral research in academia and/or industry
- Proven ability to prioritise workload work to strict deadlines
- Broad expert insights in hydrogen to have the ability to lead related sub tasks & deliverables in other work-packages
- Ability to work in a team and to take responsibility to contribute to the overall success of the team
- Industrial experience
- Strong problem solving abilities.

Candidates will be assessed on the following competencies:

Discipline knowledge and Research skills – Demonstrates knowledge of a research discipline and the ability to conduct a specific programme of research within that discipline.

Understanding the Research Environment – Demonstrates an awareness of the research environment (for example funding bodies) and the ability to contribute to grant applications.

Communicating Research – Demonstrates the ability to communicate their research with their peers and the wider research community (for example presenting at conferences and publishing research in relevant journals) and the potential to teach and tutor students.

Managing & Leadership skills - Demonstrates the potential to manage a research project including the supervision of undergraduate students.

Essential Training

Post holder will be required to undertake the following mandatory training: Orientation, GDPR, Research Integrity and Compliance. Other training may need to be undertaken when required.