

PHD RESEARCH OPPORTUNITY

Energy Systems Integration Partnership Programme

Background

Energy systems have evolved over decades from individual energy devices and small sub-systems into a complex set of systems, both physical (e.g., electricity grids, gas networks, etc.), institutional (e.g., regulatory and economic) and at different scales (e.g., from individual buildings to urban/country scale). These systems are increasingly being integrated physically (e.g., combined heat and power), institutionally (e.g., gas/electricity markets) and across scales (e.g., demand side management in power grids). *Energy Systems Integration* (ESI) is focussed on the interfaces between these systems where there are new challenges and opportunities requiring research, demonstration and deployment to harvest the commercial and societal benefits. The €11M project spans across a wide range of disciplines, such as Electrical, Chemical and Mechanical Engineering, Mathematics, Economics, Consumer Behaviour and Technology Adoption. The research work will be carried out with strong collaborative links to major energy industry players, such as AIB, EirGrid, Ervia, ESB, Glen Dimplex and other official industry collaborators. For more information, please see: <http://esipp.ie/>

PhD Research Project

A PhD studentship has arisen as part of the Energy Systems Integration Partnership Programme (ESIPP) project. The specific focus on the current research will be on energy systems integration in the context of the residential building end use sector. The aim of the research is to develop self-learning algorithms aimed at energy integration and optimisation within domestic buildings. The algorithms should be capable of optimising dynamic energy supply and demand, subject to day-ahead energy and pricing predictions, as well as exhibiting adaptive ability to self-optimize and correct for unexpected supply events, user preferences, user behaviour or residential category. It is expected that by utilising a combination of data driven machine learning techniques, building data, predictive control, a methodology that facilitates dynamic optimisation of energy supply systems (e.g., heat pumps, smart thermal storage systems, PV) for each dwelling instance, subject to user behaviour and constraints, as well as wider grid integration issues – will lead to improved system integration and performance.

Qualifications and Experience

The ideal candidate should have either a Bachelor and/or Master degree in Engineering and Computer Science, ideally with evidence of a strong interest in both energy and computer science related activities. In addition, candidates will have excellent communication and writing skills and are expected to work within a highly motivated team and on their own initiative.

Application

The position is fully funded and is available immediately. To apply, please send a CV (max 2 pages), including contactable referees and copy of relevant transcripts and a covering letter of interest to: donal.finn@ucd.ie and eleni.mangina@ucd.ie by Friday, Sept 22nd 2017. The PhD funded duration is up to four years, with a student stipend (tax free) of €18,500 per annum. Additionally, standard tuition fees, project related materials and travel will be provided, as agreed with the supervisory team.