PhD Studentship in Gas Turbine Combustion Physics

Stipend: €18,000 per annum for 4 years in addition to tuition fees

Applications are invited for a four-year PhD studentship in the research team of Prof. Stephen Dooley at the School of Physics, within the Faculty of Engineering, Mathematics and Science of Trinity College Dublin, Ireland. The position is part of an exciting international collaboration with Siemens Gas Turbines business units across Canada, Germany and the United States in part supported by Science Foundation Ireland.

Gas turbines are a major technology for energy generation, accounting for approximately one third of energy utilised across the world and in Ireland. Their dominant role is due to their ability to operate on a range of diverse fuel types and to their high efficiency. As our energy sources have diversified to include a larger contribution from intermittent renewable energy sources such as wind and solar, the gas turbine has become of yet more importance as its fast turn-up and turn-down times allows for the dynamic balancing of the grid load needed to integrate intermittent renewables.

With the carbon dioxide production targets set by the Paris Climate Accord and by the European Union, gas turbine technology must be advanced further toward higher efficiency, further fuel flexibility and reduced emission of nitrogen oxides. For this reason, Siemens Gas Turbines has recruited a team of physics and chemistry orientated engineers from Trinity College Dublin and the National University of Ireland, Galway to develop a set of computational modelling tools that will allow for cleaner and more efficient gas turbine combustors to be designed. The research at Trinity College Dublin will produce a highly accurate numerical model that accurately describes all of the important physics and chemistry occurring in the gas turbine combustion of a number of natural gas and crude oil derived fuels selected by Siemens. The major aspects of the research project are numerical in nature. However, some experimentation will be required to characterise the various fuel identities under study.

The student will work toward obtaining their PhD in a multi-disciplinr research team of four post-doctors and several students working on fundamental and applied energy research toward the mitigation of CO₂ driven climate change. The successful candidate will have an appropriate background in physical sciences, applied mathematics or engineering, with a keen motivation in applying their skills to real-world immediate climate change problems. Applicants should hold, or expect to receive, an honours degree (or equivalent) in Physics, Applied Mathematics, Mechanical/Chemical Engineering or a related discipline. Interest or experience in the conducting of numerical modelling (e.g. difference reduction, Monte Carlo and/or mathematical optimisation algorithms) with prevalent software packages or codes (e.g. matlab, fortran, python, cantera, chemkin) is an advantage. Knowledge of chemistry would also be helpful but is not essential. A Master's degree in a related area is beneficial. Enthusiasm to challenge oneself, motivation to learn (by tuition and independently) and the possession of excellent written and oral communications skills are essential.

Prospective candidates should send a detailed CV, a covering letter outlining their educational background, research interests and motivations, and the names and contact details of two referees to Prof. Stephen Dooley (stephen.dooley@tcd.ie). Following receipt of your application, Prof. Dooley will be available to discuss the research program in further detail. The anticipated start date of the project is October 2017 but this can be flexible to the timetable of the successful candidate.