

ASSESSING TIDAL ARRAY LOSSES WITH ADVANCED TURBULENCE MODELLING

PhD Scholarship 2017, Engineering Department, Lancaster University, UK

A fully-funded PhD Scholarship is now available at the Department of Engineering of Lancaster University (UK) for carrying out a pioneering research project of strong industrial relevance in the field of Marine Renewable Energy.

Many nations are committed to reducing carbon emissions worldwide. Widening the Marine Renewable Energy base has high priority in the Energy agenda of the UK and other countries in Europe and overseas. The potential of low-environmental impact tidal current energy (TCE) in Northwest Europe is one of the largest in the world, but its exploitation is growing slowly, due to the high wholesale price of TCE.



To reduce TCE cost, this project aims at analysing and reducing the energy losses in arrays of tidal current turbines due to interactions of wakes shed by front-row turbines and downstream turbines.

The project will use Navier-Stokes Computational Fluid Dynamics (CFD) and advanced turbulence analysis methods, ranging from Reynolds-Stress models to Detached Eddy Simulation and variants thereof. Turbine-resolved analyses are used, and most simulations will use significant high-performance computing (HPC) resources. Main deliverables are new reliable knowledge of tidal array hydrodynamics and energy efficiency, and a new open-source CFD framework for industrial planning and design, validated against flume tank and field data. The main academic partner is the School of Engineering of Liverpool University, and the project is carried out in close collaboration with Atlantis Resources Ltd. and EDF.

Candidates will have a first-class Masters-level degree in Aerospace/Mechanical/Hydraulic/ Marine Engineering, Physics or related areas. They will have taken courses in Fluid Mechanics, Turbulence, Computational Fluid Dynamics and/or Turbomachinery in their first degree, and will have demonstrable competence in written and spoken English, necessary for writing technical reports, preparing and delivering technical presentations. Candidates will have the potential and willingness to undertake independent research, and will be good team players, prepared to work in an international environment with project colleagues at Lancaster and at project partner sites. Highly desirable are one or more of the following: a) previous academic or industrial experience with open-source or commercial codes and grid generation software, b) FORTRAN and/or C programming languages, c) wind, gas and/or tidal current turbine fluid mechanics.

The 3.5-year Scholarship provides a stipend for its entire duration and covers University tuition fees at the UK/EU level - this Scholarship does not provide funding for the international fees of students who are not nationals of the European Union. The successful candidate will **start no later than September 2017**, and applications will be considered until an applicant is appointed. More information on the research background of the Energy group of the Engineering Department and recent and ongoing CFD-based research work is available at <http://www.lancaster.ac.uk/engineering/research/energy/> and <https://www.sites.google.com/site/mscampobasso/>.

A CV containing the contact details of at least 2 references, a transcript with marks of all courses taken in the undergraduate and postgraduate degree, and enquiries on this position and how to apply for it can be sent to Dr. Campobasso at m.s.campobasso@lancaster.ac.uk.