Post-doc or Research Assistant position offer
CFD, Tidal turbines, Comparison with Experiments

Development of a numerical tool and run of computations,
analysis of existing tidal turbines trials databases

Profile	A PhD or equivalent in the field of Computational Fluid Dynamics, Energy or Renewable Energy (Tidal or Wind).
Location	Laboratoire Ondes et Milieux Complexes (UMR 6294 CNRS – Université du Havre). 53, rue de Prony - BP 540 - 76058 Le Havre Cedex
Duration	1 year + 1 additional year already funded
Gratification	a maximum gross salary of ≈ 2700€/month depending on proven experience
Prerequisite	Good knowledge of numerical methods, coding of software and code development in the framework of a collaborative context. Knowledge of tidal or wind energy will be much appreciated. The recruited person will also be in charge of the analysis of existing tidal turbines trials databases already performed in flume tanks. An excellent command of English is absolutely required in the framework of this European project.
Dates	Deadline for application : 30th of Nov. 2018 - Starting date : 1st of February 2019
Application	CV + Cover Letter + track records by e-mail to gregory.pinon@univ-lehavre.fr

Contact

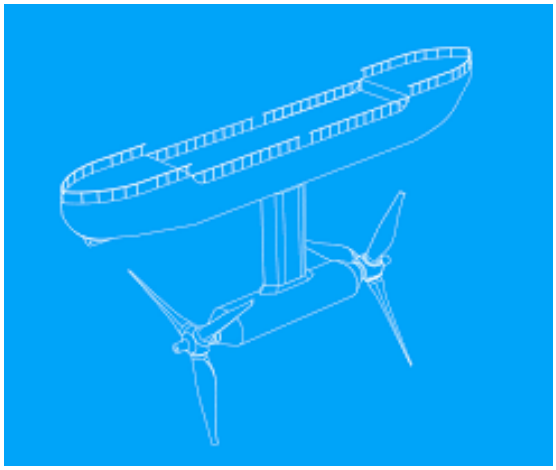
Pinon Grégory – Associate-professor – University of Le Havre Normandy / LOMC UMR 6294 CNRS
+33 (0)2 35 21 71 23 – gregory.pinon@univ-lehavre.fr

Topics

In the framework of an Atlantic Area (AA) Interreg project, we are recruiting a Post-Doc or Research Assistant (PDRA) in order to develop an existing software and run computations of different tidal turbines in a turbulent flow. In fact, MONITOR (www.monitoratlantic.eu/) is an AA Interreg project funded in June 2017 that gathers several European universities such as University of Le Havre Normandy (France), Swansea University (lead Partner, Wales UK), University of Algarve (Portugal), University College Cork (Ireland) ; research centres such as ORE catapult or EMEC ; companies such as Sabella (France) and Magallanes (Spain).

The aim of this project is to study, via a multi-model approach, tidal turbines reliability in real life flow. In fact, two full scale turbines will be used for *in-situ* measurement (Sabella turbine in Fromveur strait and Magallanes turbine at EMEC), three turbine models will be used at the model scale (the two previous ones plus the IFREMER turbine) and also for the numerical studies. Load fluctuations with respect to ambient turbulence, wave, combined wave and turbulence cases will be evaluated at the prototype and model scale and also numerically. Comparisons of numerical results with the experimental and in-situ ones will be performed. In the end, all the results will feed in a reliability tool under development at ORE Catapult.

The recruited PDRA will have in charge the final development of the numerical tool (code Dorothy, Vortex Method, [1, 2, 3]) and to run computations to compare turbine load fluctuations with the in-situ and experimental results, and also with a BEM-CFD code developed at Swansea University. The three considered turbines are

Sabella : www.sabella.fr and Magallanes : www.magallanesrenovables.com/en/proyecto

very different in term of solidity, blade profiles, number of blades, bottom-mounted or floating. The large range of scale between the prototype scale (EMEC and Fromveur strait) and the model scale (IFREMER flume tank) also enables comparison at different Reynolds numbers. Several ambient turbulence conditions and wave climates will also be considered. This gives a very large and interesting field of investigation.

The PDRA will be based in Le Havre, Normandy, France but several trips to our MONITOR colleagues in Europe will be considered during the period. As in many European projects, all the documents, discussions, meetings and reports will be in English. A very good command of English is absolutely compulsory.

Different steps :

1. Familiarisation with the MONITOR objectives.
2. Familiarisation with the numerical tool (code Dorothy) and run of regular configuration of our partners' turbines.
3. Analysis of the experimentally obtained databases at model scale ; writing of report and scientific publications.
4. Final developments of the numerical tool with respect to power assessment.
5. Run of computations in the tested configurations (either at model or full-scale) in turbulence only cases.
6. Comparison of obtained results (model scale, full scale and numerical) ; writing of report and scientific publications.
7. Development of wave module into Dorothy.
8. Run of computations in the tested configurations (either at model or full-scale) in turbulence & wave cases.
9. Comparison of obtained results (model scale, full scale and numerical) ; writing of report and scientific publications.

References :

[1] Grégory Pinon, Paul Mycek, Grégory Germain, and Elie Rivoalen. Numerical simulation of the wake of marine current turbines with a particle method. *Renewable Energy*, 46(0) :111 – 126, 2012.

[2] Paul Mycek, Grégory Pinon, Corentin Lothodé, Alexandre Dezotti, and Clément Carlier. Iterative solver approach for turbine interactions : application to wind or marine current turbine farms. *Applied Mathematical Modelling*, 41 :331 – 349, 2017.

[3] Grégory Pinon, Clément Carlier, Arnaud Fur, Benoît Gaurier, Grégory Germain, and Élie Rivoalen. Account of ambient turbulence for turbine wakes using a synthetic-eddy-method. *Journal of Physics : Conference Series*, 854(1) :012016, 2017.