

Numerical modeling of floating wind turbine in the presence of severe sea conditions with OpenFOAM

The LHEEA Lab at Centrale Nantes has an open PhD position in computational fluid dynamics to start in Fall 2019 or late 2019.

The objective of the PhD thesis is to develop a floating wind turbine simulator based on the open source code OpenFOAM. The goal is simulate the dynamic behavior of a horizontal-axis floating wind turbine and its mooring lines under severe sea conditions.

The developments will be based on the LHEEA's experience in both floating wind turbine modeling and CFD modeling.

In order to take into account severe sea conditions, a coupling between OpenFOAM and the HOS open source code developed at the LHEEA will be carried out. The thesis will benefit from previous work done at the LHEEA in the framework of international projects focused on the modeling of environmental conditions.

The simulation of mooring lines will be performed through a coupling between an open source code (eg MoorDyn) and OpenFOAM. These developments will be verified through comparisons with engineering software (FAST, DeepLines Wind...).

Finally, the [rotor-nacelle-mat] system will be modeled through a coupling with the OpenFAST open source code. Several verification studies will be carried out for different loading cases in production mode through comparison with the results of OpenFAST simulations.

Required qualifications:

- A MS degree in engineering, mathematics, physics, or other closely related fields
- A strong background in numerical methods, mathematical and fluid dynamics
- Strong hands-on experience in programming (Fortran, C/C++, Python)

Experience with OpenFoam will be a plus.

The position is available for Sept. 2019/Dec. 2019. The interested candidates should send their CV, unofficial transcripts, unofficial English language test results (if applicable), and a short cover letter (max 1-page) to jean-christophe.gilloteaux@ec-nantes.fr and Marie-laure.DUCASSE@saipem.com