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Postdoctoral position at IFP Energies nouvelles (IFPEN) in Aerodynamics

Model uncertainties in wake analysis at wind farm scale and aerodynamic loading at offshore wind turbine scale

IFP Energies nouvelles offers a one-year post-doctoral position within the framework of the EU H2020-project HIPERWIND, in collaboration with DTU, EDF, UiB, DNVGL, ETH and EPRI. HIPERWIND project aims to develop methods to reduce the levelized cost of energy and to increase the market value factor of offshore wind power plants by reducing the uncertainties in a fully integrated modeling chain.
An important step to achieve this goal is to quantify and understand the model uncertainties that are involved both in the wake analysis at the wind farm scale and in the aerodynamic loading at the wind turbine scale, for offshore metocean conditions. Two wind farms with fixed and floating wind turbines will be studied.
At the wind farm scale, you will compare high-fidelity simulations (using a coupling between a Large Eddy Simulation framework and the Actuator Line Method within the Meso-NH open source solver simulation system) to widely used engineering tools based on analytical wake models.
At the wind turbine scale, you will evaluate the uncertainty of aero-servo-hydro-elastic model using the well-known Blade Element Momentum approach, by comparing it to a Vortex–model-based approach with DeeplinesWind™.
To do so, you will have to define a design of experiment with the partners, learn about and use the different numerical models available at IFPEN, run simulations on supercomputers and analyze the results. The European partners will provide input environmental data and also simulations with other engineering and LES tools for comparison purposes. Research duties will include working in a multi-disciplinary and international environment, writing up reports, presenting your work at meetings, and managing your simulations and data. If you wish to, this work can be shared in a peer reviewed journal.
Experience in modelling the atmospheric boundary layer flows and/or aerodynamic of wind turbines are essential. Programming knowledge in python, fortran90 or C++ and experience in aero-servo-hydro-elastic models would be appreciated. A background in high performance computing for computational fluid dynamics is requested.

Keywords: Atmospheric Boundary Layer, Wind turbine aerodynamic, HPC, CFD, LES, AL, BEM, Vortex

IFPEN supervisor	Dr. JOULIN Pierre-Antoine : pierre-antoine.joulin@ifpen.fr
Postdoctoral location	IFP Energies nouvelles, Rueil-Malmaison, France
Duration and start date	1 year, starting in fourth semester of 2021
Employer	IFP Energies nouvelles, Rueil-Malmaison, France
Academic requirements	PhD in numerical fluids dynamic
Language requirements	Fluency in English, willingness to learn French

To apply, please send your cover letter and CV to the IFPEN supervisor indicated here above with the message object "post-doctorate HIPERWIND".

About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see our website.
IFPEN offers a stimulating research environment, with access to first in class laboratory infrastructures and computing facilities. IFPEN offers competitive salary and benefits packages.