CENTRALE NANTES

1, rue de la Noë
44300 – Nantes
FRANCE

Open permanent position

Senior Research Scientist in wave-wind-structure interaction for Offshore Wind and Marine Renewable Energy systems

The recruited researcher is intended to become in the medium term one of the main contact points for the activities of the LHEEA laboratory related to Offshore Wind and Marine Renewable Energy (MRE) systems. He will support, coordinate, and establish the strategy for the development of numerical activities in this domain.

Ecole Centrale Nantes

Ecole Centrale Nantes (www.ec-nantes.fr) is one of the top ten French Schools of Engineering, highly selective technical universities awarding M. Sc. Engineering and PhD degrees. It offers a large range of programmes at the graduate and post-graduate levels as well as professional development courses.

Ecole Centrale Nantes hosts more than 2200 students on its campus. It has a staff of 400 including 150 professors, lecturers and research scientists working in its 6 research laboratories.

City of Nantes

Research at Ecole Centrale Nantes is carried out in highly competitive internationally recognised laboratories. Ecole Centrale Nantes believes in an interdisciplinary approach and encourages a spirit of adventure to solve 21st centuries' major challenges: Energy transition, Manufacturing, and Health.

Ecole Centrale Nantes is located in the beautiful city of Nantes in western France, 2 hours away from Paris by train.

Ecole Centrale Nantes

LHEEA Lab.

The LHEEA (http://lheea.ec-nantes.fr), a research laboratory on Hydrodynamics, Energetics and Atmospheric Environment is a joint research unit with the French national research centre CNRS. The LHEEA laboratory has a staff of 145 including 75 professors, lecturers and research scientists with long-term or short-term positions and 35 PhD students. The LHEEA laboratory conducts scientific research in the fields of marine engineering, automotive engines and urban atmosphere. Research is carried out using theoretical, numerical and experimental methods. The LHEEA laboratory operates unique experimental facilities including:

- A large oceanic wave tank: 50m x 30m x 5m basin with 48 independently controlled flap-type wavemakers,
- A full-scale test site, SEM-REV, dedicated to the testing of marine renewable energy prototypes. The site is located 20kms offshore. It is grid-connected with an 8MW electrical cable, and it hosts the first floating offshore wind turbine in France,
- A 140m-long towing tank,
- A circulation channel,

The wave tank in Ecole Centrale Nantes

- An atmospheric boundary layer wind tunnel: 2m x 2m x 20m, velocity up to 10m/s,
- A low-speed aerodynamic wind tunnel 50cm x 50cm x 2.3m, velocity up to 38m/s.

Job profile

Context

The development of Marine Renewable Energies (MRE), including offshore wind, leads to new challenges in terms of numerical and experimental modelling for the dynamic response of light and flexible structures in the marine environment (numerical and experimental multi-physics simulation and modelling, hydro-elasticity, large space and time scales).

The LHEEA laboratory at Centrale Nantes, a joint research unit of the CNRS, is a pioneer laboratory for research in Marine Renewable Energies. With the development of this field, the activity of the LHEEA on this theme has grown very strongly over the last ten years. The highlights are the setting up of the SEMREV sea experimentation site and the hosting of prototypes within it, as well as the obtaining of a variety of European (H2020, ITN, Interreg), national (ANR, ADEME, BPI…), or regional projects within the framework of which numerous numerical and experimental activities are carried out.

The research staff of the team working today on the theme of renewable marine energies, and being at the origin of the spectacular development of the associated contractual activity, needs long-term (permanent) reinforcement to continue to take up these challenges. A lecturer has been recruited in 2020 with a focus on experimentation; it is therefore necessary to also strengthen the numerical aspects by recruiting a senior research scientist. His/her activities will focus on numerical models to simulate the interactions of the environment (wind and waves in particular) with MRE structures. This need is constant in all initiatives and projects in which the team participates, both in terms of

- Low and medium fidelity numerical models: linear and nonlinear potential flow theory (e.g., Nemoh, HOS), Blade Element Momentum, Free Vortex Wake (e.g. OpenFAST, QBlade);

- High fidelity models: RANSE and LES CFD (OpenFOAM, Grid-flow).

The senior research scientist will therefore be integrated into these activities through his/her involvement in ongoing national and European research projects. It is expected that his/ her own skills will allow him/her to accompany the team's ongoing research and to bring new research approaches and methodologies, complementary to the existing know-how. It will progressively contribute to the dynamics of the team in the setting up and management of projects and collaborations, from the regional to the international level.

Role and tasks
The IIHNE research group of the LHEEA laboratory is recruiting a permanent senior research scientist capable of:
- Engage in and then handle parts of the existing projects on the theme of Offshore Wind and Marine Renewable Energy (academic and industrial collaborations);
- Support the development of multi-physics simulation tools for the needs of research on Offshore Wind and Marine Renewable Energy systems;
- Provide expertise in wind-wave-current-structure interactions;
- Develop forthcoming activities, particularly in connection with researchers of other disciplines, such as structural mechanics and control sciences.

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Skills

The expected skills of the candidate are:

- Scientific expertise at the international level in numerical hydrodynamics, aerodynamics, and/or multi-physics tools.
- An experience in the scientific management of research projects, groups, or networks.
- Research supervision at PhD and/or post-doc level.

An excellent junior profile will also be considered.

The candidate will also demonstrate:

- Initiative,
- Teamwork and communication skills,
- Scientific writing skills,
- Multidisciplinarity.

Keywords

Offshore wind, floating wind, Computational Fluid Dynamics, potential flow solvers, multi-physics coupling, free-surface hydrodynamics, atmospheric flows, ocean engineering

Contract

Permanent position. Annual gross salary following national standards, depending on experience. Annual leave: 51 days minimum.

Application process and information

The candidate must hold a PhD and have demonstrated his/her excellence in research. Application (CV + cover letter) should be sent to candidatures@ec-nantes.fr

For more information on the position:
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