



## Open permanent position

### Senior Research Scientist in naval engineering

1, rue de la Noë  
44300 – Nantes  
FRANCE

(permanent position)

The researcher recruited is intended to become in the medium term the main point of contact for the naval hydrodynamics activities of the LHEEA. In particular, he will support, coordinate, and establish a strategy for the development of numerical and experimental activities in this domain.

#### **Ecole Centrale Nantes**

Ecole Centrale Nantes ([www.ec-nantes.fr](http://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 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.

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 21<sup>st</sup> century's 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.



*City of Nantes*



*Ecole Centrale Nantes*

#### **LHEEA Lab.**

The LHEEA lab. (<http://lheea.ec-nantes.fr>), research laboratory on Hydrodynamics, Energetics and Atmospheric Environment is a joint research unit with the French national research centre CNRS. The LHEEA lab 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 lab. 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 Lab. 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 energies prototypes. The site is located 20kms offshore. It is grid-connected with a 8MW electrical cable, it hosts the first floating offshore wind turbine in France.
- A 140m-long towing tank, equipped with a towing carriage and a wavemaker,



*The wave tank in Ecole Centrale Nantes*

- A recirculating channel,
- Two wind tunnels and different automotive engine test beds.

## **Job profile**

### **Context**

The development of the shipbuilding industry and the imperatives of the energy transition urging for the reduction of emissions are at the origin of new needs and consequently of new research subjects, both in the academia and in the research and development activities of industrial players in the sector. Different directions of research have thus emerged, among which: reduction of hydrodynamic resistance (particularly in wave), hydrodynamic/sail multimodal propulsion and clean fuels. The LHEEA laboratory at Centrale Nantes, a joint research unit of the CNRS, works on these fields of research and aims to strengthen its position in these first two directions with this position of permanent senior research scientist.

The LHEEA develops dual expertise for marine engineering in the broad sense. On the one hand, the LHEEA investigates numerical methods for free surface hydrodynamics in this field, with numerous edited or open-source software. On the other hand, it develops experimental methods in its large infrastructures dedicated to the small-scale experimentation of ships or offshore structures, with a towing tank (140mx5mx3m) and an ocean engineering tank (50mx30mx5m), both equipped with wave generators, and a circulation channel.

A number of medium/long-term collaborations have been initiated with major industrial partners such as Bureau Veritas, Naval Group, or CMA-CGM. In addition to its fundamental academic research activities, the laboratory is part of an applied research approach, which implies in particular the implementation of a quality approach that complements the usual methods for the scientific approach and integrity.

Part of the research in naval hydrodynamics at the LHEEA Lab is currently carried out within the IIHNE research group (Interfaces and Interactions in Numerical and Experimental Hydrodynamics). Various numerical activities are undertaken around the development of low-fidelity models (often built on potential flow theory) and high-fidelity ones (resolution of Navier-Stokes equations with CFD solvers). At the experimental level, the tests carried out aim at, e.g., identifying the loadings in extreme sea leading to structural damage of ships, or studying the loadings or movements of ships in waves.

### **Role and tasks**

The IIHNE research group of the LHEEA laboratory is recruiting a permanent research scientist capable of:

- Engage in and then handle parts of the existing projects on the theme of 'naval hydrodynamics' (academic and industrial collaborations).
- Support the development of simulation tools and experimental methods for the new needs of naval engineering (decarbonization, optimization, operations at sea, etc.). In particular, we are aiming for multimodal hydrodynamic/sail propulsion.
- Provide expertise in the simulation of ships propelled in waves, including manoeuvring and operation at sea.
- Develop forthcoming activities, particularly in connection with data (use of ship databases and production of experimental databases, including machine learning activities in collaboration with other researchers).

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### **Skills**

The expected skills of the candidate are:

- Scientific expertise at the international level in numerical/experimental naval hydrodynamics.
- An experience in the scientific management of research projects, groups, or networks.
- Research supervision at PhD and/or post-doc level.
- OpenFOAM knowledge would be appreciated.

The candidate will also demonstrate:

- Initiative,
- Communication skills,
- Multidisciplinarity.

### **Keywords**

Ship hydrodynamics, Computational Fluid Dynamics, experimental modeling, free-surface hydrodynamics, ocean engineering, seakeeping, maneuvering, wind assisted propulsion

### **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](mailto:candidatures@ec-nantes.fr).

For more information on the position:

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