



**Politecnico  
di Torino**



**MARINE  
OFFSHORE  
RENEWABLE  
ENERGY LAB**

## **Hydrodynamic challenges for floating airborne systems**

Marine Offshore Renewable Energy Lab  
Department of Mechanical and Aerospace Engineering  
Politecnico di Torino

### **👤 Recommended profile:**

Mechanical engineering, Aerospace engineering.

### **📚 Topics involved:**

Hydrodynamics, environmental loads, floating structures

### **👥 Collaborations and external supervisors:**

Prof. Lorenzo Fagiano and Dr. Lorenzo Trevisi, PoliMi.

## **Proposal description**

Airborne systems present an interesting scenario in onshore conditions due to their already demonstrated significant potential. Furthermore, the need to minimise extensive development of onshore infrastructure, coupled with the opportunity to harness even greater potential akin to traditional wind generators, is prompting a shift towards exploring offshore conditions for airborne systems. Unlike the onshore design of the operational ground base for these technologies, designing for offshore conditions is considerably more complex due to the hostile marine environment.

The candidate will conduct a thorough analysis of the hydrodynamic properties of floaters, assessing how such factors impact the overall system response. Consequently, the candidate is expected to identify and parameterise a promising geometry, aiming to establish a cost-effective geometry scenario.

## **Objectives**

- Define the hydrodynamics problem and identify all significant forces acting on the device.
- Develop a parametric model to incorporate nonlinearities into the model.
- Compare various geometries and analyse the floaters' response.
- Progress towards defining a novel concept of floating structure.

### **✉ Contact references:**

Dr. Bruno Paduano (bruno.paduano@polito.it)