



**Politecnico
di Torino**



**MARINE
OFFSHORE
RENEWABLE
ENERGY LAB**

Structural analysis and optimisation of offshore airborne systems

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

👤 Recommended profile:

Mechanical engineering, Aerospace engineering.

🔧 Topics involved:

Design conditions, environmental loads, floating structures, finite element methods

👥 Collaborations and external supervisors:

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

Proposal description

Airborne systems present a compelling scenario in onshore conditions, having already demonstrated significant potential. The drive to minimise extensive onshore infrastructure development, coupled with the opportunity to harness even greater potential similar to traditional wind turbines, is steering airborne systems towards exploring offshore conditions. However, unlike the onshore design of the operational ground base for these technologies, designing for offshore conditions presents substantial challenges due to the marine environment hostility.

The candidate will undertake a comprehensive analysis of the forces exerted on floating structures in marine environments. This involves elucidating the relationship between these forces and the mechanical stresses experienced by the devices. The ultimate aim is to design and optimise the system, targeting cost reduction.

Objectives

- Define the hydrodynamics problem and identify all significant forces acting on the device.
- Develop a structural design modelling framework for offshore airborne systems.
- Create a simplified, low-fidelity model for preliminary design of the floating system, aiming to reduce computational time.

✉ Contact references:

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