



<b>SUPERVISOR INFORMATION</b>	
First and Last name	Sara Rios
URL of supervisor webpage	<a href="https://www.cienciavitae.pt/7010-C18A-E048">https://www.cienciavitae.pt/7010-C18A-E048</a>
Department	Civil Engineering
Field(s) of research	Geotechnics
<b>PROJECT PROPOSAL</b>	
Title (optional)	Station-keeping systems for floating offshore wind in the European North Atlantic area – a geotechnical approach
Brief project description	
<p>Due to the rough North Atlantic metocean conditions and the limited shallow water areas suitable for deployment of bottom-fixed offshore wind turbines, the development of the offshore wind sector needs to consider the less mature Floating offshore wind (FOW) foundations suitable for deep waters. Despite its recognised energy potential and successful demonstration projects carried out both with single platforms and small, grid-connected wind farms (e.g., Windfloat), offshore wind in the North Atlantic still lags behind in comparison to other European offshore areas (e.g., North Sea). This context highlights the interest of developing innovative, reliable, and cost-effective mooring systems for FOW platforms suitable for the Atlantic, to reduce the levelized cost of energy and make technologies commercially attractive to investors.</p> <p>Under the marine environment loading, the floating structure's foundations will have complex six degrees of freedom motions as a function of the mooring system, anchoring solution, and seabed material. Existing geotechnical models for the cyclic behaviour of anchoring systems are mostly based on horizontal loads. This project aims to evaluate the combined effect of vertical (mostly tensile) and horizontal cyclic loading on the behaviour of foundation soils. Moreover, depending on the type of soil and frequency of the cyclic loading, the drainage conditions may vary, so the effect of different drainage conditions on the soil behaviour will also be analysed.</p> <p>These results will be integrated into a soil-structure numerical analysis of the anchor system taking into account the soil cyclic behaviour, the loads on the anchor and the scour effects. The aim is to evaluate the performance of the system towards design optimisation and cost reduction.</p>	