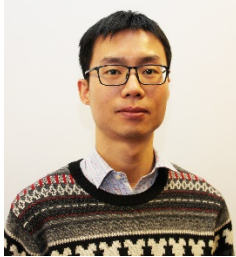


Name and picture:

Zhiyu Jiang (Postdoc)

**Title:**

Efficient and accurate numerical methods and models for dynamic response analysis for installation of offshore wind turbines

Short ingress:

When using a floating vessel to install wind turbine blades or rotor-nacelle assembly, dynamic behaviour of the coupled system under simultaneous wind and wave loads are complicated. It is challenging to accurately model such floating system and predict the dynamic responses for design of the installation mechanism and system. The purpose of this study is to develop accurate numerical methods and models to analyse the actual installation procedure and to obtain the system responses for design check. The following case studies will be considered.

- Advanced modelling and analysis of the installation system for a pre-assembled rotor-nacelle-tower using the novel catamaran developed by NTNU Ålesund for design check and for validation of the numerical models used in the real-time simulation. The focus will be on modelling of the coupled system of the catamaran vessel, rotor-nacelle-tower and lifting mechanism.
- Conceptual design and optimisation of the very large floating dock concept for installing pre-assembled rotor-nacelle-tower system.
- Modelling of floating installation vessels to study the effectiveness on roll motion reduction using various damping devices (such as flopper-stopper, anti-roll tank).

Industrial goals:

- To assess the feasibility of novel installation methods for a pre-assembled rotor-nacelle-tower system
- To reduce the roll motions of floating vessels to increase the weather window for installation

Scientific questions:

- How to accurately model the coupled system of a floating installation vessel, blades or rotor-nacelle-tower assembly and a bottom-fixed or floating foundation and predict the dynamic responses under stochastic wind and wave loads?
- How to address the hydrodynamic and structural design aspects of a very large floating dock?
- How to reduce the roll motions of a floating installation vessel by passive or active damping devices?

Innovations:

- New numerical methods and models for dynamic response analysis of installation systems

Cooperating company:

OSC, DNV-GL, Ocean Installer, Statoil

Supervisor: Zhen Gao,

Co-supervisor: Karl Henning Halse