



DC8

Beneficiary/employer: Ramboll

PhD Enrolment: University of Thessaly

Main location: Copenhagen, Denmark

Duration: 36 Months

Supervisors: Tobias Friis (Ramboll) and Costas Papadimitriou (University of Thessaly)

Secondments:

DC8S1: Host: University of Thessaly, Costas Papadimitriou, (M13-M18) 6 months on fundamentals of statistical assessments of data from edge computing

DC8S2: Host: Ramboll Germany, (M31-M33), 3 months on industrial approaches of fleet level data validation.

Data fusion for on-the-edge fatigue assessment of offshore wind turbine supports

Description

The doctoral network called *Decentralized Infrastructure Asset **MO**nitoring and **co**NDition assessment* (DIAMOND) will train a new generation of Early Stage Researchers. The main objective is to enable a smarter and more intelligent decision-making process for predictive maintenance to help ensure the success of the green energy transition. This is feasible through data-driven methods that combine sensor data, digital twins, and machine learning. Ramboll leads one of these projects, focusing on life-time extension of offshore wind turbine supports. Thus, the aim is to extend the service life of offshore wind structures, reduce material use and waste, and strengthen the sustainability and competitiveness of renewable energy.

Offshore wind turbine (OWT) support structures are prone to fatigue damages and are exposed to lifetime hazardous marine environments with dynamic loading from wind, waves, ice, salinity, seabed changes and even earthquakes. Potential downtime or even collapse can

cause large monetary losses and confidence erosion in renewable energy. Structural Health Monitoring of OWT support structures and their asset management are key to ensure lifetime performance, safety, financial competitiveness and design life extension while improving sustainability and reliability with increased knowledge of structural behaviour and environmental impact to improve future designs. DC8, supported by Ramboll's state-of-the-art, modular solutions for digitally enabled asset management and digital twinning (DT) will deliver unique asset management excellence via continuous data aggregation and in-house designs, statistics, system identification, virtual sensing for fatigue estimates, ML for state estimation and deep OWT domain knowledge. The DT solution will address core challenges in transferring large data for analyses and the reliance on full-scale design engines for fatigue estimation by improving/extending existing procedures for efficient data transfer, computing costs, and software to move towards self-aware infrastructure. DC8 will assimilate DT solutions with on-site capabilities and decision making/asset management tools at fleet level integrated with Value of Information (VoI) analyses, identifying optimal key performance indicators (KPIs) for maximized benefit.

Eligibility Criteria:

Doctoral Candidates must not have been awarded a doctoral degree. Conditions of international mobility requires that researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of the first recruiting host organization (Denmark) for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.

Required profile/research interests:

- ✓ The candidate must hold a 2nd level Master of Science (120 ECTS + 180 ECTS in a bachelor degree) or equivalent degree in Civil or Mechanical Engineering or in fields closely related to the project's subject matter.
- ✓ Candidates who are not in possession of the required qualification at the call closing date may apply but the academic qualifications must be awarded before enrollment.

Contributions for Recruited Researchers over 36 months

Living Allowance: €191,710.08

Mobility Allowance: €25,560

Family Allowance: (where relevant) €17,820

This position and related financial contributions are subject to the commencement of the project and agreement signed.