

POSEIDON – MSCA DN: DC01

PhD Project Title: GeoAcoustic Mapping and Soil Classification

Enrolment in Doctoral degree(s): Université de Bretagne Occidentale (UBO)

Supervisors: Dr. Marco Terzariol, Dr. Antonio Cattaneo

Recruitment host: French Institute for Ocean Science (Ifremer)

Secondment host: Dr Emmanuelle Gautier (CA)

Background and aim:

Offshore acoustic high-frequency backscatter strength is typically used as a proxy of soil classification. Their correct interpretation can lead to important cost reduction in exploration, further sampling strategies and the study of seafloor natural phenomena. There is urgent need to obtain geotechnical properties from high-frequency acoustic surveys. Its low-cost respect to other exploration approaches, and the improvements in computational methods and equipment, makes it very attractive for offshore site examination. Advances in recent years were able to analytically derive and validate in laboratory the correlation between the coefficient of reflectivity and sediment's void ratio at low effective stress. However, this geotechnical approach has not been tested in natural environments yet.

Our objective is to validate and expand this new approach using artificial and natural sediments at the lab and field scale to better understand the interaction of acoustic wave backscatter strength and soil structure at low stress at various frequencies, grain size and depositional environments. We will study a natural environment (Concarneau Bay, Brittany, France) as a test site and expand our findings to other potential European locations.

Objectives:

- i) Develop, validate and calibrate a novel methodology for soil classification from high-frequency acoustic backscatter data and surface sediment sampling in Concarneau Bay;
- ii) Explore the upscaling from the lab test behavior up to field-scale interpretation;
- iii) Extrapolate this approach to other potential European sites for offshore renewable energy and sediment migration monitoring (to be confirmed, depending on data availability).

Expected Results:

- i) Validate a novel physically driven methodology of soil classification prediction from high-frequency acoustic backscatter;
- ii) Better understanding of geoacoustic sediment mapping in natural environments;
- iii) A major leap of understanding of soil classification and sediment migration at a large scale;
- iv) Set up the guidelines for site exploration and streamline this methodology for different applications (offshore wind farms, sediment migration, etc.).

Your Profile:

The ideal candidate should:

- Have a MSc degree in a relevant field as geotechnical engineering, hydro acoustics, geophysics, civil engineering, physics, materials science or related areas;
- Have experience in lab testing, instrumentation, calibration, and field testing;
- Be curious and eager to learn new approaches to soil classification, bathymetry mapping and wave propagation;



- Be enthusiastic to contribute and participate in multidisciplinary groups and ready to share your knowledge with academic and industrial collaborators;
- Be able to communicate in the English Language fluently.

Planned Secondment(s):

Dr Emmanuelle Gautier (CA, 3 months): Data collection and compile initial datasets.

Dr Emmanuelle Gautier or a colleague (CA, 3 months): Data integration, sub-seafloor characterization analysis, model validation.

Information and application

Please submit your application before **February 28, 2024** via the following application link:

<https://utwentecareers.nl/en/vacancies/1606/13-phd-positions-on-the-eu-horizon-2020-marie-skiodowska-curie-project-poseidon/>

Submission must include:

- **Cover Letter:** A maximum of two A4 pages, highlighting your specific interest in the position, your qualifications, and motivations for applying. This letter should clearly articulate how your background and experiences align with the requirements of this project
- **Detailed Curriculum Vitae (CV):** The CV, should include, if applicable, a list of publications;
- **Bachelor and Master transcripts;**
- **Contact Details of Referees:** Provide the names and contact information of individuals who can professionally vouch for your qualifications and suitability for this position.

For general inquiries on the application procedures and the consortium please contact: info@poseidon-dn.eu