POSEIDON – MSCA DN: DC07

PhD Project Title: Efficient landslide tsunami model with generalized rheological properties

Enrolment in Doctoral degree(s): Oslo Metropolitan University
Supervisors: dr. Finn Løvholt and dr. André Brodtkorb
Recruitment host: Norvegian Geotechnical Institute
Secondment host: University of Liverpool

Work description:

NGI is seeking candidates for a PhD position related to numerical modelling of landslide tsunamis within our Section of Geohazards and Dynamics under the Offshore Energy Market Area. For more information about NGI, see www.ngi.no. The candidate will further be enrolled in the PhD program at OsloMet - Oslo Metropolitan University.

The position is attached to the Horizon Europe POSEIDON project (https://poseidon-dn.eu/) which is a Doctoral Training Network under the MSCA, including 13 individual Doctoral Candidates. The position is entitled “Efficient landslide tsunami model with generalized rheological properties” and has the number DC07 within the project. The overall objective of POSEIDON is to improve offshore infrastructure resilience against geohazards towards a changing climate. The topic for this PhD grant is to improve prediction capabilities related to submarine and subaerial landslide tsunamis.

The candidate will be responsible for developing a coupled landslide-tsunami model with optimized dispersion and to prepare and use the model for different types of scientific investigations to shed light on the physics of the tsunami generation processes. These scientific investigations may range from modeling benchmark tests, simulations of past events, and future hazard applications. An important focus of the model development will be to embed a realistic time-dependent material model into the landslide model to improve our conceptual understanding of the tsunami generation processes. The work should also include investigation of additional features such as landslide erosion and curvature effects on tsunami-genesis. We foresee developing a depth-averaged layered model applicable for both fully subaqueous landslides and landslides originating subaerially that will be implemented in a realistic 3D topography/bathymetry. We further envision that the model will be implemented using a Finite Volume scheme using GPUs to ensure a rapid execution time of the code.

The applicant is expected to visit partners from the POSEIDON consortium from other European countries for secondments of up to approximately six months and will have to participate in joint network-wide training activities abroad.

Competence needs:

The candidate must have a MSc, or other corresponding education equivalent to a Norwegian MSc covering some of the following fields: scientific computing, fluid mechanics, wave mechanics, physics, mathematics, engineering, geophysics, or related fields. Solid skills in both programming (e.g. C++, Fortran) and scripting (e.g. Python), good command of Linux, are prerequisites.

Moreover, experience in one or more of the following topics will be positively valued:

- Scientific programming using GPU's, programming in CUDA or related languages
- Experience with message-passing interface methods and OpenMP
- Numerical modeling of partial differential equations, Finite Volume methods
- Experience with water-wave models for tsunami applications

This project has received funding from the European Union under Grant Agreement No **101120236**.

- Experience with numerical modeling of landslides
- Good command of mathematical tools such as Matlab and R

Planned Secondment(s):

University of Liverpool, 3 months: The purpose of the secondment is to compare and analyze together the developed models in this PhD project with relevant landslide-tsunami models from Univ Liverpool.

Eligibility criteria

Admission to the doctoral program in Engineering Science (https://www.oslomet.no/en/study/tkd/engineering-science-phd) at the Faculty of Technology, Art and Design within three months of employment is a prerequisite for the position. If you already have a doctoral degree, you will not qualify for the position. The qualification requirements include the following (see webpage for full details):

- The master's degree must contain 120 credits (ECTS)
- Minimum average grade B on subjects included in the master's degree.
- Minimum grade B on the master's thesis.
- Minimum average grade C on the subjects included in the bachelor's degree. If you have an integrated master's degree, the grades from the first three standard years of the degree will be assessed.

Candidates must meet all MSCA DC eligibility requirements, including the Mobility Rule. The mobility rule implies that researchers must not have resided or carried out their main activity (e.g., work, studies) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their recruitment date.

Benefits:

Successful candidates will receive a highly competitive salary in accordance with MSCA regulations for Doctoral Candidates. The salary includes living allowance, a mobility allowance, and a family allowance (if applicable). DC employment is expected for a period of 36 months.

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**;

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- **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

Details about the position can be requested at Finn.Lovholt@ngi.no

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