# PhD position in Local structural response due to wave slamming (IV-156/19)

## Depart

Department of Marine Technology

We develop methods and technology related to the blue economy: oil and gas extraction at sea, ship technology and the equipment industry, fisheries and aquaculture. We also have a strong commitment to the development of sustainable solutions for offshore renewable energy, coastal infrastructure, and marine robotics. Marine technology helps to solve major global challenges related to the environment, climate, energy, food and efficient transport. The Department of Marine Technology is one of eight departments in the Faculty of Engineering.

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## About the position

We have a vacancy for a PhD related to the following topic:

“Local structural response due to wave slamming”

The position reports to;

Main supervisor: Professor Marilena Greco, Department of Marine Technology, NTNU, Trondheim.

Contact person about the KPN project SLADE: Dr. Bjørn Christian Abrahamsen, Sintef Ocean, Trondheim. Email: BjornChristian.Abrahamsen@sintef.no.

## Job description

- This position is connected with the
  - KPN project SLADE on “fundamental investigations of violent wave actions and impact response”, led by SINTEF Ocean
  - Associated with the multidisciplinary Centre of Excellence NTNU AMOS on “autonomous marine operations and systems”
- SINTEF is one of Europe’s largest independent research organisations. SINTEF Ocean has together with NTNU world-leading laboratory and test facilities.
- The objective of SLADE project is to improve safety at sea, for which impact loads from steep and energetic waves represent a critical factor. This requires a better understanding of the mutual interaction between the impacting wave and the response of the structure. In order to enable this, the project will perform: (A) experimental studies of relevant wave-impact scenarios and (B) systematic theoretical and numerical investigations guided and validated by (A) and complementing (A). This will bridge the gap between model tests and reliable structural integrity assessment and will enable a robust and practical basis for design of optimal structures with the required safety level.

Specifically for this PhD study:

- **Motivation**. One of the fundamental unresolved problems in design of large volume ocean structures is the accurate prediction of structural response due to wave slamming. The critical waves are very steep and contain massive wave breaking, which represent a challenge for available simulation tools. Moreover, depending on the structural and geometrical properties at the impact, the local fluid dynamic field may strongly couple with the structural deformations.
- **Research methodology and outcomes**. The research tools consist of theoretical and numerical approaches. The main discipline for this position is marine hydrodynamics, but proper studies of wave-body impacts require combining and coupling methods of hydrodynamics and structural mechanics. The PhD candidate will collaborate in the analysis of drop tests and wave impact tests performed by SINTEF Ocean within SLADE, consistently with (A)-(B) research strategy described above. In particular, the choice of the PhD research methods should be based on the underlying physics of the different impact mechanisms identified in the tests. PhD findings shall contribute to improved design procedures for slamming response calculations.

## Qualification requirements

**PhD candidate:**

The qualification requirement is completion of a master's degree or second degree (equivalent to 120 credits) with a strong academic background in Marine Technology, Aeronautical Engineering, Mechanical Engineering, Applied Mathematics, or equivalent education with a grade of B or better in terms of NTNU's grading scale. Applicants with no letter grades from previous studies must have an equally good academic foundation. Applicants who are unable to meet these criteria may be considered only if they can document that they are particularly suitable candidates for education leading to a PhD degree.

The appointment is to be made in accordance with the regulations in force concerning State Employees and Civil Servants and national guidelines for appointment as PhD.

Other qualifications

- Master students graduating summer 2019 can apply.
- Master students graduating by the end of June 2020 may apply for admission as integrated MSc and PhD.
- Excellent English skills, written and spoken, are required. Applicants from non-English speak countries outside Europe must present an official language test report. The acceptable tests are TOEFL, IELTS, and Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE). Minimum scores are:
  - TOEFL: 600 / writing 4.5 (paper-based test), 92 / writing 22 (internet-based test)
  - IELTS: 6.5, with no section lower than 5.5 (only Academic IELTS test accepted)
  - CAE/CPE: grade B or A.
- The application should contain information of educational background and prior training, exams, and work experience. Certified copies of academic diplomas and transcripts must be attached. Applicants from universities outside Norway are kindly requested to send a diploma supplement or a similar document, which describes in detail the study and grading system and the rights for further studies associated with the obtained degree.
- High skills in physical understanding and mathematical modelling

## Personal characteristics

- Hard working and dedicated
- Strong ability to express research work and results in English, both written and orally
- Flexible and dependable
- Collaborative

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability, as well as motivation, in terms of the qualification requirements specified in the advertisement

## We offer

- exciting and stimulating tasks in a strong international academic environment
- an open and inclusive work environment with dedicated colleagues
- favourable terms in the Norwegian Public Service Pension Fund
- employee benefits

## Salary and conditions

PhD candidate:
PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 449 400 before tax per year. From the salary, 2 % is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years. Appointment to a PhD position requires admission to the PhD programme in marine technology.

As a PhD candidate, you undertake to participate in an organized PhD programme during the employment period. A condition of appointment is that you are in fact qualified for admission to the PhD programme within three months.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachment are seen to conflict with the criterias in the latter law will be prohibited from recruitment to NTNU. After the appointment you must assume that there may be changes in the area of work.

## General information

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. Under the Freedom of Information Act (offentleglova), information about the applicant may be made public even if the applicant has requested not to have their name entered on the list of applicants.

Questions about the position within the KPN project SLADE can be directed to Dr. Bjørn Christian Abrahamsen. Email: BjornChristian.Abrahamsen@sintef.no.

About the application:
Publications and other academic works that the applicant would like to be considered in the evaluation must accompany the application. Joint works will be considered. If it is difficult to identify the individual applicant's contribution to joint works, the applicant must include a brief description of his or her contribution.

Please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates. Applicants invited for interview must include certified copies of transcripts and reference letters. Please refer to the application number IV-156/19 when applying.

**Application deadline: 15 May 2019**

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

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