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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.

Faculty of Engineering

Department of Mechanical and Industrial Engineering

PhD 3 Positions in Offshore Mechatronics (IV-89/17, IV-90/17, IV-91/17)

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Faculty of Engineering Science (http://www.ntnu.edu/iv) at the Norwegian University of Science and Technology (NTNU) has vacancy for three PhD positions at Department of Mechanical and Industrial Engineering (http://www.ntnu.edu/mtp).

Do you wish to create the future in offshore operations?

Three PhD positions are available at Department of Mechanical and Industrial Engineering at the Norwegian University of Science and Technology (NTNU), Trondheim, Norway. The positions are full-time positions for 3 years to reach the PhD degree at NTNU. It may be possible to have a 4-year position with 25% duty work. Applicants should have an MSc in mechanical engineering, mechatronics, marine technology, control theory, cybernetics, physics and mathematics, or similar.

The positions are funded by SFI Offshore Mechatronics (sfi.mechatronics.no), which is a program for research-based innovation (SFI) and a joint collaboration between NTNU, the University of Agder, the Norwegian Government, and industrial partners. The research in close contact with the industrial partners, which provides an exciting combination of long-term academic research and industrial innovation. The PhD candidates employed under this program will be part of a coordinated research group of 15-20 members with extensive laboratory facilities

Information about the department
The Department of Mechanical and Industrial Engineering (MTP) has broad interdisciplinary expertise in the fields of logistics, machine design, product development, materials science, risk and reliability of complex systems. The research at the department focuses on development, optimization and improvement of industrial processes and production systems. One of our goals is to secure the Norwegian industry and administration with access to knowledge and expertise on an international level. The PHD candidates will be affiliated to the Production Systems Group.

Position 1: WP4.1 Integrated simulation of multi-physical systems in offshore operations (IV-89/17)

Background: Modern offshore operations involve many diverse physical systems that must all work harmoniously to achieve the desired objectives in a safe and economical manner. Simulation is an invaluable tool in planning, coordinating and developing new operations. These simulations may involve FEM models, CFD models, signal-based simulators, and component-oriented simulators. Such simulators can be run in combination in some cases, while in other cases the simulators must be integrated. Design methods and guidelines for how to combine different types of simulators for different simulation tasks pose and interesting academic challenge and would be of great use to the industry.

Objectives: The PhD candidate will investigate simulator design for systems that are described by FEM, CFD, signal-oriented modules and component-oriented modules. Design rules for simulator implementation will be developed. In particular, the candidate will investigate when different simulators can be run in combination, and when simulators must be integrated in a Modelica or Simulink implementation. The study will include the use of the Modelica framework to define component-oriented model libraries, and will in this context introduce results and techniques from the automotive and aerospace industries to the offshore sector.

Contact: Associate Professor Christian Holden, christian.holden@ntnu.no

Mark your application with **ref.no. IV-89/17**

Position 2: WP4.2 Component-based simulation systems for drilling automation and crane systems (IV-90/17)

Background: Drilling and crane systems are an essential part of many offshore operations, operations which are made complicated by inclement weather and complex dynamics. To safely plan and perform these operations and control the expensive and complex

equipment, simulations are a necessity. Component-based simulation systems will aid in this. These simulations are based on libraries of models of physical system components and lead to very efficient implementation of modular simulation systems. The simulator performance will depend on proper interfacing between the library modules. In particular, the selection of input and output variables is important.

Objectives: In this project, the PhD candidate will develop a library of component models in Modelica for simulation in Dymola and Simulink. Design rules for interconnection of library modules will be developed for use in simulator development. The use of multiple CPUs and GPUs for fast and real-time simulation will be studied. This library will be used to build an implementation of simulators for case studies in drilling automation and crane systems.

Contact: Associate Professor Christian Holden, christian.holden@ntnu.no

Mark your application with **ref.no. IV-90/17**

Position 3: WP4.4 Modeling and simulation of cable and pulley systems in offshore cranes (IV-91/17)

Background: Cable and pulley systems are critical components in offshore cranes. It is important to have mathematical models that can be used in simulation and analysis to investigate challenges in design, operation and maintenance due to distributed mass, flexibility and stick-slip friction effects.

Objectives: This PhD project will develop dynamic models of offshore cranes with focus on cables and pulley systems in interaction with crane models including mechanism dynamics in finite-element models. Component-oriented modeling and the use of real-time simulation in a digital twin solution will be investigated.

Contact: Professor Terje Rølvåg, terje.rolvag@ntnu.no

Mark your application with **ref.no. IV-91/17**

Qualifications
The regulations for PhD programmes at NTNU state that a Master degree or equivalent with at least 5 years of studies and an average grade of A or B within a scale of A-E for passing grades (A best) for the two last years of the MSc is required, and C or higher of the BSc. Candidates from universities outside Norway must send a Diploma Supplement or a similar document describing in detail the study and grade system and the rights for further studies associated with the obtained degree: http://ec.europa.eu/education/tools/diploma-supplement_en.htm

The positions require spoken and written fluency in English.

Applicants who are finalizing their MSc during the spring of 2017 are also encouraged to apply.

Conditions:
PhD Candidates are remunerated in code 1017, and are normally remunerated at wage level 50, gross NOK 430 200 before tax. There will be a 2 % deduction to the Norwegian Public Service Pension Fund from gross wage.
Engagement as a PhD Candidate is done in accordance with “Regulation concerning terms and conditions of employment for the posts of post-doctoral research fellow, research fellow, research assistant and resident”, given by the Ministry of Education and Research of 19.07.2010. The goal of the positions is to obtain a PhD degree. Applicants will engage in an organized PhD training program, and appointment requires approval of the applicants plan for a PhD study within three months from the date of commencement.
See https://innsida.ntnu.no/doktorgrad for more information.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. Women are encouraged to apply. According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

The application:
Applications must contain information of educational background and work experience, reference person(s), CV, possible publications and other scientific works, certified copies of transcripts and reference letters. In addition a project description of 1-2 pages including a short presentation of the motivation for a PhD study, how the applicant sees his/her background suitable, the applicant’s view of research challenges within the area of the PhD position and how the competence of the applicant can contribute to solve these challenges.

Applications and attachments have to be submitted electronically through www.jobbnorge.no. Applications submitted elsewhere will not be considered.

Please state clearly in the application each IV-number of the position(s) you apply for

Start-up date may be discussed, but tentatively August 2017.

Application deadline for all 3 positions: 31 March 2017

According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

Jobbnorge ID: 135599, Deadline: 31.03.2017, Internal ID: IV-89/17, IV-90/17, IV-91/17