The Department of Chemical Engineering has a vacancy for a

**PhD position "Production optimization"**

**This is NTNU**

At NTNU, creating knowledge for a better world is the vision that unites our 7 000 employees and 40 000 students.

We are looking for dedicated employees to join us.

NTNU is Norway's main institution for engineering, and in the Department of Chemical Engineering there is a PhD position in the field of "Field-wise production optimization".

Video: [https://www.youtube.com/watch?v=cIgKd1SwGLI](https://www.youtube.com/watch?v=cIgKd1SwGLI)

**About the position**

The PhD project is part of the SUBPRO center which is a large 8-year research-based innovation program in the field of subsea processing and production. Industrial partners in SUBPRO include Equinor, Lundin, AkerBP, Neptune Energy, Aker Solutions, DNVGL and Kongsberg Digital.

The overall objective of the PhD project is to achieve low-cost production with a low carbon footprint towards the final aim of achieving zero emissions oil and gas production.

Scientifically, the PhD project focuses towards online process optimization using both existing software infrastructure and advanced optimization tools as well as machine learning and data analytics.

Daily production optimization is an important aspect throughout the production phase of any oil and gas field, where the objective is to maximize the operational profits on a day-to-day basis. With the recent focus on low carbon footprint of oil and gas operations, the daily production optimization must also aim to reduce the carbon footprint of day-to-day operations in addition to increasing production rates. In order to take into account the carbon footprint of the subsea production network, it is important to consider not just the subsea wells, but also the subsea processing equipment such as compact separators, subsea compressors and booster pumps in the daily production optimization problem. Therefore, this project will take a holistic view of the entire field including the subsea well network and the subsea processing equipment in the production optimization problem.

Production optimization requires detailed model of the system in order to determine the optimal operation of the field. However, as the complexity of the systems increases, the models used may be uncertain or may not be able to capture the real production system accurately. In order to address this issue, we also propose to incorporate real time production data into real time decision making, by using machine-learning algorithms.

This project will build upon the PhD work of Dinesh Krishnamoorthy on "Production optimization under uncertainty" where we developed different algorithms that can use such transient measurements efficiently for optimization. One of the deliverables of the new project is to apply these methods to industrial cases. This project also aims to develop new machine learning based algorithms for online production optimization, which when combined with the existing first-principle models result in what is called a grey-box model. Such a model is more flexible and has potential for further savings. Furthermore, we want to develop further software tools and methods in order to optimize production from a field while reducing emissions.

**Qualification requirements**

The PhD-position's main objective is to qualify for work in research positions. The qualification requirement is completion of a master's degree or second degree (equivalent to 120 credits) with a strong academic background 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, postdoctor and research assistant.

NTNU is committed to following evaluation criteria for research quality according to The San Francisco Declaration on Research Assessment - DORA.

Other qualifications

- The successful candidate should have background in process systems engineering
- Good written and oral English language skills
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

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 with the possibility of until one year extension with 25 % teaching duties.

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 can be directed to Sigurd Skogstad, e-mail: sigurd.skogstad@ntnu.no

Further information:
https://folk.ntnu.no/skoge/mer/subpro/SUBPRO-PhD-Production-optimization.pdf
https://folk.ntnu.no/skoge/
https://www.ntnu.edu/subpro

The project is financed by the Norwegian research council and SUBPRO through the SUBPRO program. The PhD student will be integrated in the SUBPRO program as well with the Process Systems Engineering Group at NTNU, which has about 30 Faculty, PhD students and Master students.

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 NV-58/19 when applying.

Application deadline: 17.06.19

NTNU - knowledge for a better world

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

Department of Chemical Engineering

We take chemistry from laboratory scale to industrial production. This demands a wide range of knowledge, from molecular processes and nanotechnology to building and operation of large processing plants. We educate graduates for some of Norway's most important industries. The Department of Chemical Engineering is one of eight departments in the Faculty of Natural Sciences.

Jobbnorge-ID: 170442, Søknadsfrist: Avsluttet