NTNU

Kunnskap for en bedre verden

**Jobbnorge-ID:** 151400
**Søknadsfrist:** Closed
**Nettside:**
**Omfang:**
**Varighet:**

# PhD position within Rational Alloy Design - Intelligent Manufacturing of High Value Aluminium Components (PhD5) (SO IV-149/18)

A PhD position is available at the Department of Mechanical and Industrial Engineering. The appointment has a duration of 3 years with the possibility of until 1 year extension with 25% teaching duties and/or research activities in agreement with the Department. The position is financed by the NTNU initiative NTNU Digital Transformation and is a part of the project Rational Alloy Design - ALLDESIGN, and has a special responsibility for the sub-project Intelligent manufacturing of high value aluminium components.

**Information of the ALLDESIGN project**
The primary objective is to create a digital materials design platform for intermetallic alloy design. The project focuses on aluminium-based alloys, which are of great importance for the Norwegian industry. ALLDESIGN will investigate the physical processes behind slow-diffusion precipitation phenomena starting from atomistic scale and in silico. Our goal is to develop efficient theoretical methods to understand materials properties at different length and time scales and to limit costly trial-and-error measurements in the laboratory. Such output can considerably help in materials screening and finding optimal thermochemical treatment conditions. Complementary to the theoretical work will be experimental high-resolution characterization (including development of data processing algorithms) and validation of the theoretical results. Finally, the data from the multiscale modelling approach will be used for digitalization of the alloy manufacturing process in the newly invested 3D stretch-bending machine. The project involves a simultaneous recruitment of 1 post-doctoral fellow and 4 PhD students in complementary research areas within the same NTNU digital transformation call.

**Job description**
The theme of the PhD research will be on modelling in-line and real-time adaptive response system to significantly improve product property accuracy in aluminium forming. Critical inputs to such a model are the materials thermomechanical and deformation history, alloy composition, process parameters, timeline between events, and expected properties and tolerances accepted by further downstream processing and use. These inputs can be derived from upstream theoretical models, to develop "digital twin" of the adaptive manufacturing system, as well as empirically by the use of a new and advanced value chain product tracking system. Hypothetically, theoretical and empirical inputs can be utilized to develop a machine learning system, which automatically calibrates the forming process to produce the required product properties. The main objective is to assess relevant input parameters, convert and model them to be big-data-ready, develop machine learning algorithms to pattern the ideal machine behaviour, and experiment and verify the model in the 3D bending machine that is installed in relation to ManuLab/NAPIC.

We are seeking a person with good understanding of mechanical engineering and/or machine learning with strong motivation and experience in modelling / simulations - preferably related to aluminium.

Detailed information on our PhD programs is found at: https://www.ntnu.edu/iv/doctoral-programme

**Qualifications**
The applicant must have an educational background (MSc or equivalent) in:
- Mechanical engineering
- Zero defect high value manufacturing
- Kybernetics
- Machine learning systems

Experience with methods for mechanical testing will be considered as an advantage.
The successful candidate should be creative, with a strong ability to work problem oriented. He/she should also enjoy interdisciplinary research and take keen interest in learning and working in teams.
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. Candidates from universities outside Norway are kindly requested to send a Diploma Supplement or a similar document, which describes 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 position requires spoken and written fluency in the English language. Applicants from non-English-speaking countries outside Europe must document English skills by an approved test. Approved tests are TOEFL, IELTS and Cambridge Certificate in Advanced English(CAE) or Cambridge Certificate of Proficiency in English (CPE).

**Terms of employment**
The appointment of the PhD fellows will be made according to Norwegian guidelines for universities and university colleges and to the general regulations regarding university employees. Applicants must agree to participate in organized doctoral study programs within the period of the appointment and have to be qualified for the PhD-study.

NTNU’s personnel policy objective is that the staff must reflect the composition of the population to the greatest possible extent.

PhD Candidates are remunerated in code 1017, and are normally remunerated at gross NOK 436 900 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 qualifications plan for a PhD study within three months from the date of commencement.

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.

Master students finishing in June 2018 may apply.

Place of work is at NTNU in Trondheim, Norway.

Information abouth The Department of Mechanical and Industrial Engineering is available at: https://www.ntnu.edu/mtp

**The application**
Applications with CV, certificates from both Bachelor and Master, possible publications and other scientific works, copies of transcripts, (copies of documentation on English language proficiency test) and reference letters should be submitted.

Further information can be obtained from professor Geir Ringen and professor Torgeir Welo, Department of Mechanical and Industrial Engineering, Tel. +47 416 79 834, E-mail: geir.ringen@ntnu.no/ torgeir.welo@ntnu.no

Applications must be submitted electronically through www.jobbnorge.no.
Applications submitted elsewhere will not be considered.

The reference number of the position is: **SO IV-149/18**

**Application deadline: 27.05.2018**

## Tilleggsinformasjon

### Arbeidssted: