Jobbnorge ID: 256033
Deadline: 1/28/2024
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Fixed Term

The Department of Materials Science and Engineering has a vacancy for a

Postdoctoral Fellow on multi-scale and through process modelling of aluminium alloys

This is NTNU

NTNU is a broad-based university with a technical-scientific profile and a focus in professional education. The university is located in three cities with headquarters in Trondheim.

At NTNU, 9,000 employees and 43,000 students work to create knowledge for a better world.

You can find more information about working at NTNU and the application process here.

Video: https://youtu.be/Xt-yHCN5QS0

About the job

Development of new alloys and products in industry is to a large extent based on trial-and-error experimental approaches, which is both costly and time consuming. This becomes more critical for the metal and manufacturing industries, with application of more recycling-based metals in the production cycles and with the broader application of AM technology. To realize such computation-engineering-based alloy and product development, a series of through-scale and through-process physical models are necessary. More importantly, a full and effective coupling between individual microstructure, processing and property models must be achieved.

Duties of the position

The physical metallurgy group at DMSE, NTNU has a long tradition for and expertise in the development and application of physically-based computer-models for the evolution of microstructure and texture during thermomechanical processing of aluminium alloys. This includes models for precipitation, work hardening, crystal plasticity, recovery, recrystallization and grain growth.

An important objective of SFI PhysMet is to allow for more use of recycled metal in the metal-based manufacturing industry. For recycled-based alloys, high concentration and higher number of alloying elements and impurity elements further increase the complexity of the production process. Under such conditions, the existing models are not capable of adequately describing the microstructure evolution and the associated material properties performance. An important objective is therefore to further develop existing (and possibly new) models, which can handle these more complex chemistries and processing conditions.

Existing models for microstructure evolution during thermomechanical processing cannot properly deal with transient conditions experienced during complex thermomechanical processing, e.g. during extrusion, hot forging and forming lines. Therefore, a second objective is to further develop and generalize existing microstructure-evolution models for heat treatment, recrystallization and work hardening/crystal plasticity, to account also for transient conditions.

The improved models should then be used as sub-models in finite-element simulation software to simulate the thermomechanical processes and predict the properties of products.

If appropriate and needed, machine-learning-based approaches may also be a part of the research activities, allowing for a combination of the through-process modelling tools with artificial-intelligence approaches will be applied to improve the digitalization and automatization level of user partners in their production.

The work may include experimental trials in terms of material composition, process parameter studies, characterization of microstructures and evaluation of properties, - to provide experimental input to the models and for validation.

Required selection criteria

- Completed a Norwegian doctoral degree or corresponding foreign doctoral degree recognized as equivalent to a Norwegian PhD in Materials Science and Engineering, Physics, Materials Chemistry, Mechanical Engineering or equivalent.
- Strong academic background from previous studies.

- Strong background with an extensive experience with numerical/mathematical modelling and simulations of nano-/microstructure phenomena in materials science and engineering.
- Experience with model implementation/programming in Fortran, C/C++, Python or similar computer languages.
- Good written and oral English language and communication skills. Knowledge of a Scandinavian language is considered as a plus.

The appointment is to be made in accordance with Regulations on terms of employment for positions such as postdoctoral fellow, Ph.D Candidate, research assistant and specialist candidate.

Preferred selection criteria

- The relevant candidates should have an educational background which preferably includes hands-on experience with methods for characterization of materials microstructure and texture and mechanical testing and characterization, as well as numerical simulation tools such as Finite Element Modelling.
- Some knowledge of Machine Learning methodologies is an advantage.

Personal characteristics

- Creative, with a strong ability to work goal-oriented and independently.
- Good skills to deliver oral and written presentations of research results.
- He/she should also enjoy interdisciplinary research and take keen interest in working in project teams.

Emphasis will be placed on personal and interpersonal qualities.

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

As a Postdoctoral Fellow (code 1352) you are normally paid from gross NOK 594 500 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 2 years.

Startup: Since this postdoc will be closely connected to already ongoing activities, a quick startup will be preferred.

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 criteria 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.

The position is subject to external funding (ta stilling til om stillinger skal være betinget av ekstern finansiering).

It is a prerequisite you can be present at and accessible to the institution on a daily basis.

About the application

The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must be attached to the application. Please note that applications are only evaluated based on the information available on the application deadline. You should ensure that your application shows clearly how your skills and experience meet the criteria which are set out above.

If, for any reason, you have taken a career break or have had an atypical career and wish to disclose this in your application, the selection committee will take this into account, recognizing that the quantity of your research may be reduced as a result.

The application must include:

- CV and certificates, including list of publications and information pertaining to the given qualifications
- transcripts and diplomas for bachelor's-, master's- and PhD degrees.
- A copy of the doctoral thesis. If you are close to submitting, or have recently submitted your thesis, you can attach a draft of the thesis. Documentation of a completed doctoral degree must be presented before taking up the position.
- Possible academic works - published or unpublished - that you would like to be considered in the assessment (up to 5 items)
- The required documentation of English language proficiency.
- Name and contact information of three referees.

If all, or parts, of your education has been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education. Description of the documentation required can be found here. If you already have a statement from NOKUT, please attach this as well.

Joint works will be considered. If it is difficult to identify your contribution to joint works, you must attach a brief description of your participation.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal and interpersonal qualities. Motivation, ambitions, and potential will also count in the assessment of the candidates.

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

General information

Working at NTNU

NTNU believes that inclusion and diversity is a strength. We want our faculty and staff to reflect Norway's culturally diverse population and we continuously seek to hire the best minds. This enables NTNU to increase productivity and innovation, improve decision making processes, raise employee satisfaction, compete academically with global top-ranking institutions and carry out our social responsibilities within education and research. NTNU emphasizes accessibility and encourages qualified candidates to apply regardless of gender identity, ability status, periods of unemployment or ethnic and cultural background.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the innovation capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you want to reserve yourself from entry on the public applicant list, this must be justified. Assessment will be made in accordance with current legislation. You will be notified if the reservation is not accepted.

If you are interested in the position or have any questions, please contact Professor Knut Marthinsen, telephone +47 41513972, e-mail knut.marthinsen@ntnu.no, Professor Bjørn Holmedal +47 90084946, email bjorn.holmedal@ntnu.no, or Assoc. Professor Tomas Manik, e-mail tomas.manik@ntnu.no.

If you think this looks interesting and in line with your qualifications, please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates attached. Applications submitted elsewhere will not be considered. Upon request, you must be able to obtain certified copies of your documentation.

Application deadline: 28.01.2024.

NTNU

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 Materials Science and Engineering

We are Norway's leading educational and research environment in materials engineering, materials chemistry and materials science. In collaboration with business and industry, we are a driving force for the development of innovative materials as well as new applications and manufacturing processes. Activities in our disciplines are vital for the green shift. The Department of Materials Science and Engineering is one of eight departments in the Faculty of Natural Sciences.

Additional information

Place of service:

Høgskoleringen 1 7491 Trondheim (Trondheim Municipality)