Announcement of NTNU-CSC PhD Scholarship

**Digital Twin in Manufacturing of Complex Aluminium EV Products**

**Type of scholarship:** Degree-seeking PhD

**Period of the scholarship:** Aug 2022 – Jul 2025 (36 months)

**Short description of the scholarship:**

We are looking for a 3-year PhD Candidate within the field of “Metal Forming and Advanced Manufacturing”.

The PhD candidate will be part of the NTNU Aluminium Product Innovation Center (NAPIC). NAPIC is also part of the MANULAB - a Norwegian Manufacturing Laboratory Infrastructure project - where state-of-the-art laboratory technology for aluminium forming, welding, additive manufacturing, hybrid processing, assembly, and material characterization is available. NAPIC is hosted by the Department of Mechanical and Industrial Engineering. The centre is a unique collaboration between NTNU, SINTEF, aluminium manufacturing industries, and select customers. The aim is to explore new aluminium product opportunities, employing a research-driven innovation approach based on cross-disciplinary collaboration between product design and development, manufacturing, materials technology, and product application. NAPIC is becoming a world leader in research-driven aluminium product innovation.

The position will be directly or indirectly related to industrial research projects primarily directed towards advanced electric vehicles (EV) manufacturing. In detail, the position will seek to develop digital twin based smart systems to control the manufacturing process chain with respect to product quality, productivity, and sustainability, accelerating the development of lightweight aluminium extrusion products such as battery trays, chassis and suspension systems, safety/crashworthiness systems and components, etc. The ambition of this PhD position is thus to contribute to this strategic blueprint through innovative research.

**Exchange opportunity at Texas A&M University and The Hong Kong Polytechnic University**

We have collaboration with Texas A&M and Hong Kong Polytechnic University, and thus there could be an opportunity for short exchange under the current contract with the two institutes. We have dual degree-seeking PhD candidates with Texas A&M University and exchange doctoral students with HK PolyU already.
Duties of the position

The PhD candidate will work on challenging research problems related to advanced forming and manufacturing of aluminium products towards Industry 4.0, including:

- Develop physical or numerical models for the manufacturing chain of 6xxx aluminum products, with a focus on extrusion and forming (advanced bending), to understand the process behaviors.
- Contribute to the design and implementation of sensors for inline/off-line data collection during forming processes, conduct data analysis based on experimental and numerical simulations.
- Develop physics-based, data-driven (e.g. machine learning) models and strategies for closed-loop control of the manufacturing processes.
- Collaborate with partners from MANULAB and industries, contributing to the industrial CPS integration.
- Conduct and publish high-level research at peer-reviewed journals and international conferences to qualify for an academic career.

Qualification and requirement:

- Master’s degree or second degree (equivalent to 120 credits) with a strong academic background in Mechanical Engineering, Material Processing, Manufacturing or related field, or equivalent education with a grade of B or better in terms of NTNU’s grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you are unable to meet these criteria you may be considered only if you can document that you are particularly suitable for education leading to a PhD degree. (The diplomas, certificates and transcripts should be provided.)
- Personal characteristics: good communication skills, curious, collaborative, dedicated, Independent, self-going and progress-oriented

In addition, for all applicants the following applies:

- Fluent English language, both written and spoken with certificates or other exemptions proofs required by CSC.
- Chinese citizenship documents (copy of his/her passport or national ID of P.R. China
- CV
- A motivation letter (maximum 1 page)

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 announcement.

Deadline for submission of application: 15th Feb 2022

Scholarship: 17,000 NOK/month (minimum) for a period of up to 36 months
CSC will provide a living stipend, currently 12,500 NOK per month for a period of up to thirty-six (36) months, and a round-trip international airfare between China and Norway. NTNU will provide a monthly additional funding for a period of up to thirty-six (36) months, which combined with the CSC living stipend ensures the sufficient income (currently minimum 17,000 NOK per month) required by NTNU. No tuition fees will be charged for PhD candidates at NTNU.

Supervisor info:
Torgeir Welo, Professor, Head of Department, NTNU - Department of Mechanical and Industrial Engineering, Email: torgeir.welo@ntnu.no
Jun Ma, Associate Professor, NTNU - Department of Mechanical and Industrial Engineering, Email: jun.ma@ntnu.no

Email and contact information for where to send the application:
Please send the application documentation to Dr. Jun Ma: jun.ma@ntnu.no, with a copy to Prof. Torgeir Welo. Thanks!