Announcement of NTNU-CSC PhD Scholarship

Sustainable and durable concrete reinforcement by recycled aluminum

**Type of scholarship:** PhD scholarship

**Period of the scholarship:** August 2022 - Jul 2025

**Short description of the scholarship:**
The demand for durable and sustainable reinforced concrete is increasing due to the existing challenges with environmental issues associated with concrete production. Recent developments in radically new types of binders have paved the way for introduction of aluminum reinforcement which were not compatible with the traditional cementitious binders leading to cementitious composites with improved durability and reduces environmental impacts.

The candidates will be part of a research group investigating how increasing post-consumer scrap contents in aluminium affect manufacturing processes, mechanical properties of the material and end-product as well as lifecycle performance in circular business models. The candidates will be connected to the recent research project, AluGreen, owned by Norsk Hydro ASA and funded by the Norwegian Research Council and a consortium of 16 industry partners. Moreover, this project is aligned to long-term research programs such as SFI PhysMet and NAPIC (NTNU Aluminium Product Innovation Centre).

Materials with environmental benefits will be exploited in the forms of binders, rebar, fibers, fillers and aggregates to achieve the goal of this project. The PhD candidate will investigate different solutions such as incorporation of natural- recycled- or nanomaterials to adjust the intended material properties.

Furthermore, analytical models will be developed based on investigated material properties followed by generalization and maturation of the models which can be beneficial for different applications such as BIM databases or 3D printing. Finally, environmental assessment of the investigated compositions will be carried out.

The PhD project is primarily meant for 50% experimental and 50% analytical work. However, depending on practical constraints and candidate’s interest the actual work distribution may vary.
Qualification and requirement:

- 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 in, e.g. Materials science, Civil engineering and Structural engineering, Mechanical and industrial engineering, Physical metallurgy, Manufacturing technology, Industrial ecology, or equivalent education with a grade of B or better in terms of NTNU’s grading scale.
- Preferred selection criteria
  - The candidate should have a background, and practical experience, with at least two of following fields:
    - Fresh and hardened properties of concrete
    - Properties of Aluminum alloys
    - Durability of construction materials
    - Advanced numerical simulation (FEM/CFD)
    - Knowledge of artificial intelligence including machine learning
  - Comfortable with working in laboratory environment

In addition, for all applicants the following applies:

- Fluent English language, both written and spoken with certificates of TOEFL minimum 95 or IELTS minimum 6.5
- Chinese citizenship documents (copy of his/her passport or national ID of P.R. China
- CV
- A motivation letter

Deadline for submission of application: 15th Feb 2021

Scholarship: 17000 NOK/month for a period of up to 36 months

According to the NTNU-CSC agreement
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.
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Email and contact information for where to send the application:
Please send the application documentation to Dr. Mohammad H. Baghban:
mohammad.baghban@ntnu.no, with a copy to Dr. Guomin Ji: guomin.ji@ntnu.no
Thanks!