Jobbnorge ID: 278591
Deadline: 4/25/2025
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Temporary

The Department of Structural Engineering has a vacancy for a

PhD Candidate in Real-Time FEM for Digital Fabrication in Structural Engineering

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

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

About the position

Are you motivated to take a step towards a doctorate and open up exciting career opportunities? As a PhD Candidate with us, you will work to achieve your doctorate, and at the same time gain valuable experience that qualifies you for a further career in higher education and research, in and outside academia.

This PhD position investigates how real-time Finite Element Method (FEM) analysis can be integrated into digital and robotic fabrication processes in structural engineering. The research targets the development of responsive design-to-production workflows that adapt structural design based on live performance feedback during fabrication. The project focuses on bridging digital simulations with physical execution using robotic arms, particularly for solid structural elements like timber assemblies or additive manufacturing (e.g. 3D printing). The candidate will design and implement computational tools that enable this adaptive behavior, combining parametric modeling, robotic control, and real-time structural simulation. The goal is to support more informed, efficient, and precise fabrication workflows that respond to environmental and material variations. Conducted within NTNU's Conceptual Structural Design Group (CSDG), the position offers a unique blend of theoretical research and hands-on experimentation, aiming to redefine the synergy between digital design environments and physical construction practices.

Your immediate leader will be associate Professor Marcin Luczkowski.

About the project

This project explores the integration of real-time Finite Element Method (FEM) analysis with robotic and digital fabrication processes. The goal is to enable adaptive and responsive design-to-production workflows, particularly for solid structural elements. The project will develop computational tools and physical prototypes that align real-time simulation with robotic arm control in processes such as timber assembly or 3D printing.

Duties of the position

- Complete the doctoral education until obtaining a doctorate
- Carry out research of good quality within the described framework
- Academic publications and popular science dissemination
- Participate in the research group Conceptual Structural Design Group (CSDG)
- Participate in international activities such as conferences and/or research stays at foreign educational institutions
- Teaching (as applicable)
- Other career-promoting work (as applicable)

Be prepared for changes to your work duties after employment.

Required selection criteria

- You must have an academically relevant background within structural engineering, computational mechanics, architecture or related disciplines.
- You must have a Master's degree in structural engineering, computational design, architecture, mechanical engineering or informatics, or equivalent.
- Your course of study must correspond to a five-year Norwegian course, where 120 credits have been obtained at master's level. Master's students can apply, but the master's degree must be obtained and documented before starting the position and no later than August 1st.
- You must have a strong academic background from your previous studies and have an average grade from your Master's degree study, or equivalent education, which is equal to B or better compared to NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you have a weaker grade background, you may be considered if you can document that you are particularly suitable for a PhD education.
- You must meet the requirements for admission to the faculty's Doctoral Programme.
- Good oral and written presentation skills in Norwegian or English language equivalent to level B2.
- Good programming skills (any programming language, but C# or python preferred).

PLEASE NOTE: For detailed information about what the application must contain, see paragraph "About the application".

If you cannot document skills in Norwegian, Swedish or Danish at level A2 upon employment, you will have the opportunity to complete Norwegian courses corresponding to 15 credits before the end of the employment period. NTNU will facilitate this.

The appointment is to be made in accordance with Regulations for the Universities and Colleges Act (university and colleges regulations) and Regulations for the degrees philosophiae doctor (ph.d.) and philosophiae doctor (ph.d.) in artistic development work at the Norwegian University of Science and Technology (NTNU) for general criteria for the position.

Preferred selection criteria

- Experience with FEM tools such as Abaqus, Ansys, Karamba3D
- Familiarity with robotic fabrication techniques and equipment
- Programming experience in Python, C#, or related languages
- Knowledge of parametric modeling platforms such as Rhino/Grasshopper
- Understanding of real-time structural analysis and digital twin principles
- Good oral and written presentation skills in a Scandinavian language at level A2 or higher

Personal characteristics

To complete a doctoral degree (PhD), it is important that you are able to:

- Work independently
- Work in a structured way, set goals and make plans to achieve them
- Present and discuss your research with other professionals
- Get involved and contribute constructively with feedback
- Show curiosity and a strong motivation for the subject

Emphasis will be placed on personal qualities.

We offer

- An exciting job with an important mission in society
- Developing tasks in a strong and international professional environment
- Career guidance and follow-up during the PhD period
- Open and inclusive working environment with committed colleagues
- Working capital that can be used to implement the project
- Mentor programme as a new employee at NTNU
- As a public employee, you have favourable benefits as a member of the Norwegian Public Service Pension Fund (SPK)

You will be employed as a PhD Candidate at NTNU and will have access to employee benefits and discounts.

Diversity

Diversity is a strength, and at NTNU we aim to be an employer that reflects the diversity in society and that makes use of the potential of the population's collective skills. Our vision is Knowledge for a better world and our values are creative, critical, constructive and respectful. We believe that an organization that is equal, diverse and gender-balanced is essential for us to achieve our goals.

We strive to attract employees with different skills, life experiences and perspectives to contribute to even better problem solving of our societal mission in research and education.

If you think this position is relevant and interesting, we encourage you to apply, regardless of gender, functional ability and cultural background, or whether you have been out of work for a period of time.

At NTNU we want to increase the proportion of women in scientific positions. We have a number of measures to promote equality.

Salary and conditions

In the position of PhD Candidate, code 1017, your gross salary will normally be NOK 536 200,- per annum depending on qualifications and seniority. A 2% statutory contribution to the State Pension Fund is deducted from the salary.

The employment period is 3 years.

For employment as a PhD Candidate, it is a prerequisite that you gain admission to the PhD programme in Engineering within three months of your employment contract start date, and that you participate in an organized doctoral programme throughout the period of employment.

The position is conditional on external funding.

As an employee at NTNU, it is important that you keep yourself up to date with academic and organizational changes and adapt to them.

For the necessary academic and social interaction, it is a prerequisite that you are physically present and available to the institution on a daily basis.

The appointment is carried out in accordance withthe principles of the State Employees Act, and Export control(legislation that regulates the export of knowledge, technologyand services). Candidates who, after assessment of the application and attachments, are considered to bein conflict with the criteria in the latter act, will not be able to be employed.

About the application

The attachments (including a description of your scientific work) must accompany the application as these documents form the basis of the application assessment. The documents must be in Norwegian/a Scandinavian language or English.

Please note: the application will only be assessed on the basis of the information we have received by the application deadline. Therefore, make sure that your application clearly shows how your skills and experience meet the criteria described above. The application and all attachments must be sent electronically via Jobbnorge.no. If you are invited to an interview, you must bring certified copies of certificates The application must include:

- Transcripts and diplomas for Bachelor's and Master's degrees
- CV
- Copy of Master's thesis. If you have recently submitted your Master's thesis, you can attach a draft of the thesis. Documentation of a completed Master's degree must be presented before taking up the position.
- Short letter of motivation (400 words/1 page)
- Possibly publications etc. other relevant research work
- Possibly certificates
- Names and contact information of three relevant 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, both Bachelor's and Master's education, in addition to other higher education. If your institution uses “diploma supplement” (normal for most European institutions), you must attach this. A description of the documentation required can also be found here. If you already have a statement from Norwegian Directorate for Higher Education and Skills (HK-dir), please attach this as well.

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

When assessing the best qualified, we emphasize necessary qualifications such as education, experience and personal suitability. Motivation for the position, ambitions and potential for research will also count when assessing the candidates.

NTNU recognizes a wide range of academic contributions and has committed itself to The San Francisco Declaration on Research Assessment and CoARA (responsible assessment of research and recognition of a greater breadth of academic contributions in accordance with NTNU's social mission).

General information

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you wish to be exempt 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 exemption is not granted.

If you think this position looks interesting and in line with your qualifications, you are welcome to apply.

If you have any questions about the position, please contact associate Professor Marcin Luczkowski, +47 73594534, email marcin.luczkowski@ntnu.no.

If you have any questions about the recruitment process, please contact HR Consultant June Hovde, e-mail: june.b.hovde@ntnu.no.

Application deadline: 25.04.2025

For practical information about working at NTNU, please visit this webpage.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the tech 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.

NTNU - knowledge for a better world

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 Structural Engineering

We teach mechanical engineering, engineering and ICT, and civil and environmental engineering. The Department conducts internationally leading research and participates in several large national research projects. The Department of Structural Engineering is one of eight departments in the Faculty of Engineering.

Additional information

Place of service:

Høgskoleringen 1 7491 Trondheim (Trondheim Municipality)