

**NTNU**Norwegian University of
Science and Technology

The Department of Materials Science and Engineering vacancies for
Two PhD Candidates in Materials Science / Physics

About the position

For a position as a PhD Candidate, the goal is a completed doctoral education up to an obtained doctoral degree.

- Are you a passionate researcher?
- Do you have a master degree in Physics, Nanoscience, Materials Science, or equivalent?
- Are you motivated to work in a diverse and multidisciplinary team?
- Would you like to help this team solve fundamental questions that can lead to more sustainable technologies?

If so, you may be the persons we are seeking for one of the two PhD projects supervised by Prof. Dennis Meier at the Norwegian University of Science and Technology in Trondheim, Norway, as part of the European training network TOPOCOM (“*Topological solitons in ferroics for unconventional computing*”). For more information on TOPOCOM, please refer to www.topocom.eu

The two PhD projects are mainly experimental in nature and aim to characterize electric and magnetic materials. We want to learn to control their nanoscale structure and emergent topological defects and demonstrate possible pathways utilizing their unique physical properties for the design of extremely efficient memory devices and low-energy computing.

Project 1: Magnetic spin textures for low-energy computing – The PhD candidate will characterize the static and dynamic properties of local spin textures in nano-structured systems, learn to create such spin textures on demand, and develop simple demonstrator devices for neuromorphic and autonomous low-power computing applications. The PhD candidate will learn how to model such spin textures using micromagnetic simulations and fabricate and characterize basic devices structures by combining focused ion beam (FIB) nanostructuring and magnetic force microscopy.

Project 2: Ferroelectric domain walls for reservoir computing – The PhD candidate will study the electronic properties of ferroelectric domain walls and explore how individual walls and networks can be used as reservoirs for unconventional computing. The PhD candidate will apply advanced scanning probe microscopy methods, scanning electron microscopy, and electrical measurements to characterize the domain walls and their functional properties. FIB-based nano-structuring will be applied to work towards first proof-of-concept devices.

(Please clearly indicate in the cover letter of your application for which of the two PhD positions, i.e., project 1 or project 2, you are applying.)



The two positions are part of in total 11 PhD projects of the European program TOPOCOM, that joints experts from academic institutions and industry, from Norway, Germany, Italy, Greece, and the Netherlands, to work on ferroelectric and ferromagnetic materials, both from the theory and experimental side. The network will ensure excellent training by world-leading scientists and different partner companies, close interactions with other PhD candidates who share your research interest, and a stimulating work environment. Working as team, we will find materials-based solutions in the field of unconventional computing.

TOPOCOM emphasizes accessibility and encourages qualified candidates to apply regardless of gender identity, ability, status or ethnic and cultural background.

Additional information: www.topocom.eu; www.cordis.europa.eu/project/id/101119608

Apply here: <https://www.jobbnorge.no/en/available-jobs/job/251207/two-phd-candidates-in-materials-science-physics>

Duties of the position

The two PhD candidates will perform original research, working closely together with the group members in the team at NTNU, as well as other PhD candidates from the TOPOCOM network. This includes network-wide training events and secondments at different universities and partners from industry. The PhD candidates will plan and conduct experiments according to the project objectives with support from the PI and the team. The experimental work includes advanced scanning probe microscopy studies (e.g., magnetic force microscopy, piezoresponse force microscopy and conducting atomics force microscopy). In addition, project 1 will involve micromagnetic simulations, that will guide the experimental work. These and additional measurements will be performed on test devices, which the PhD student will fabricate using FIB (focus ion beam) and lithography methods. In addition to the TOPOCOM events and training, the PhD candidates will present their work at international conferences and in written form in scientific articles.

Required selection criteria

- You must have a professionally relevant background in Physics, Nanoscience, Materials Science, or equivalent, with expertise on magnetic (project 1) or electric (project 2) materials.
- Your education must correspond to a five-year Norwegian degree program, where 120 credits are obtained at master's level.
- You must have a strong academic background from your previous studies and an average grade from the master's degree program, or equivalent education, which is equal to B or better compared with NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic basis. If you have a weaker grade background, you may be assessed if you can document that you are particularly suitable for a PhD education.
- Master's students can apply, but the master's degree must be obtained and documented by January 31st, 2024.
- You must meet the requirements for admission to the [faculty's doctoral program](#)
- Good written and oral English language skills are required.

The appointment is to be made in accordance with [Regulations on terms of employment for positions such as postdoctoral fellow, Phd candidate, research assistant and specialist](#)



[candidate](#) and [Regulations concerning the degrees of Philosophiae Doctor \(PhD\) and Philosophiae Doctor \(PhD\) in artistic research at the Norwegian University of Science and Technology \(NTNU\)](#)

Preferred selection criteria

For project 1, a strong background and hands-on experience in micromagnetic simulations and/or magnetic force microscopy is desired. In addition, the ideal candidate has a good understanding of magnetism and basic expertise in FIB-nanostructuring, and can document a strong background in solid state physics.

For project 2, a strong background and hands-on experience in scanning electron microscopy (SEM), advanced scanning probe microscopy (piezoresponse force microscopy, conductive atomic force microscopy, and local electrostatic measurements) is desired. In addition, the ideal candidate has a good understanding of ferroelectrics, basic expertise in FIB-nanostructuring, and can document a strong background in solid state physics.

Personal characteristics

We search for a person that is creative, innovative and can work independently. The person we are searching for has excellent communication skills, likes travelling, and enjoys collaborating with other PhD candidates, postdocs, and international researchers.

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 PhD candidate (code 1017) you are normally paid from gross NOK 491 200 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 **3** years.

Starting date: As early as possible, but no later than February 28th, 2024 (project 2) and June 30th, 2024 (project 1).

Appointment to a PhD position requires that you are admitted to the [PhD programme](#) within three months of employment, and that you participate in an organized PhD programme during the employment period.



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 via the HORIZON.1.2 - Marie Skłodowska-Curie Actions (MSCA). MSCA Doctoral Networks 2022 – [TOPOCOM](#) (*Grant agreement ID: 101119608*)

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 follow the application. Please note that your application will be considered based solely on information submitted by the application deadline. You must therefore ensure that your application clearly demonstrates how your skills and experience fulfil the criteria specified above.

The application must include

- Cover letter, clearly stating for which of the two positions you are applying. Also give a short statement why you would like to be part of a doctoral network and what you feel you can contribute to TOPOCOM.
- CV and certificates
- transcripts and diplomas for bachelor's and master's degrees. If you have not completed the master's degree, you must submit a confirmation that the master's thesis has been submitted.
- A copy of the master's thesis. If you recently have 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.
- Name and contact information of three referees
- If you have publications or other relevant research work

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. Description of the documentation required can be found [here](#). If you already have a statement from NOKUT, please attach this as well.

We will take joint work into account. If it is difficult to identify your efforts in the joint work, you must enclose a short 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 our strength. We want to recruit people with different competencies, educational backgrounds, life experiences and perspectives to contribute to solving our social responsibilities within education and research. We will facilitate for our employees' needs.

NTNU is working actively to increase the number of women employed in scientific positions and has a number of [resources to promote equality](#).

[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 have any questions about the position, please contact Prof. Dennis Meier, email: dennis.meier@ntnu.no.

If you have any questions about the recruitment process, please contact Marie Kristiansen, e-mail: marie.kristiansen@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: 01.12.2023

Apply here: <https://www.jobbnorge.no/en/available-jobs/job/251207/two-phd-candidates-in-materials-science-physics>



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](#)