PhD fellowship at the Department of Mathematical Sciences, NTNU, Trondheim, Norway

About the position

The position is offered within the EU Marie Skłodowska-Curie Innovative Training Networks in the project "Joint Training on Numerical Modelling of Highly Flexible Structures for Industrial Applications [THREAD]". The salary of the Marie Skłodowska-Curie Innovative Training Networks Fellowship (MSCA-ITN) follows the regulations set by the European Commission. The salary will include social security and will be composed of living, mobility and family allowances, where applicable, as outlined in the Grant Agreement and Horizon 2020 Marie Skłodowska-Curie Actions Work Programme, please see here.

The Department of Mathematical Sciences at NTNU is Norway’s largest university environment in mathematical sciences with 85 permanent staff members and about 100 doctoral students and postdoctoral fellows. The department conducts research at an international high level within the disciplines of algebra, analysis, didactics of mathematics, differential equations, geometry/topology, numerical analysis, optimization, and statistics. Part of the research is also conducted in close cooperation with other fields of science and technology at NTNU, as well as in cooperation with industry and external research institutions.

The workplace will be in Trondheim. See https://www.ntnu.edu/imf for further information about the department.

Duties of the position

Background: THREAD addresses the mechanical modelling, mathematical formulations and numerical methods for highly flexible slender structures like yarns, cables, hoses or ropes that are essential parts of high-performance engineering systems. With 14 new PhD positions at 12 universities and research institutions in Austria, Belgium, Croatia, France, Germany, Norway, Slovenia and Spain, the project brings mechanical engineers and mathematicians together around major challenges in industrial applications and open-source simulation software development.

The position at NTNU, is assigned to the following project:

Data driven modelling of cables and hoses.

This project is supervised by Prof. Elena Celledoni who is an expert of numerical analysis of differential equations and geometric numerical integration. We aim at developing numerical methods for PDE models of slender structures that respect fundamental, underlying geometric properties of the equations. These discretization methods should be able to cope with the high flexibility of the structure and resolve large rotations. The PhD student will learn about the models of beams and rods and become familiar with a number of modern numerical discretization techniques for these models, as well as their implementation.

The main methodology will be based on finite elements space discretization and geometric numerical integrators in time.

We will consider suitable techniques for incorporating information from data (e.g. from laboratory experiments). To this end, we intend to combine machine learning techniques inspired by optimal control with the PDE models. Industrial applications will be pursued in collaboration with the industrial partner TechnipFMC in Norway and with the Fraunhofer Institute in Germany.

Required selection criteria

- MSc in Mathematics, Computational physics, Computational engineering (with strong mathematical background) is preferred.
- The admission to PhD education at NTNU requires an average grade of A or B within a scale of A-E for passing grades (A best) for the last two years of the MSc, and C or higher for the BSc.
- Applicants must also satisfy the requirement for entering the PhD programme at NTNU; please see https://www.ntnu.edu/ie/research/phd for more information.
- Experience in programming numerical methods is highly desirable, in particular knowledge and experience with programming languages such as Matlab or Python.
- Experience in numerical analysis is important and some competence in mathematical modelling with differential equations is desirable.
- Applicants who do not master a Scandinavian language must document a thorough knowledge of English (equivalent to a TOEFL score of 600 or more).
- Qualification as an "Early Stage Researcher", i.e. at the time of appointment no doctoral degree and less than 4 years of research experience (full-time equivalent) after obtaining a degree that formally allows you to embark for a doctorate.
- Mobility requirement: at the time of appointment an "Early Stage Researcher" must not have resided or carried out their main activity in Norway for more than 12 months in the 3 years immediately prior to their appointment.
- The appointment is to be made in accordance with the regulations in force concerning State Employees and Civil Servants and national guidelines for appointment as PhD, post doctor and research assistant.
- For more details please see here: https://thread-etn.eu/apply/
**Personal characteristics**

The following personal characteristics will be emphasized:

- motivation for pursuing a PhD degree
- good communication skills
- interest in learning

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability, in terms of the qualification requirements specified in the advertisement.

**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](https://www.persp.no/)
- employee benefits

The department has a strong focus on a good work environment for both permanent and temporary employees. As part of this effort, we offer both social and scientific activities for our PhD candidates.

**Salary and conditions**

PhD candidates are normally remunerated at gross from NOK 479 600 per annum before tax (excl. allowances). From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years with no teaching, but the Department may offer a 4th year with teaching and other duties for approximately 25% of the entire 4-year period.

Appointment to a PhD position requires admission to the PhD programme in mathematics; please see [http://www.ntnu.edu/ie/research/phd](http://www.ntnu.edu/ie/research/phd) for information about the PhD programme at NTNU.

As a PhD candidate, you undertake to participate in an organized PhD programme during the employment period. A condition of appointment is that you are in fact qualified for admission to the PhD programme within three months.

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.

**About the application**

The application must include the following:

- Information about education background and work experience.
- Contact information for 1 to 3 scientific references
- Documentation of fluency in the English language.

Shortlisted candidates will be asked to provide the following documents later in the application process:

- Any relevant publications. Joint work will only be considered provided that a short summary outlining the applicant's contributions is attached.
- Certified copies of relevant transcripts and diplomas. Candidates from universities outside Norway are kindly requested to send a Diploma Supplement or similar documentation, which describes in detail the programme of study, the grading system, and the rights to further studies associated with the degree obtained.

Please submit your full application dossier only in English before May 24, 2020. Applications must be submitted on the website [https://thread-ctn.eu/apply/](https://thread-ctn.eu/apply/)

**General information**

**Working at NTNU**

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. Under the Freedom of Information Act (Offentleglova), information about the applicant may be made public even if the applicant has requested not to have their name entered on the list of applicants.

The national labour force must reflect the composition of the population to the greatest possible extent, NTNU wants to increase the proportion of women in its scientific posts. Women are encouraged to apply.

Questions about the position can be directed to Elena Celledoni, elena.celledoni@ntnu.no, phone: +47 482 38 584.

**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 ([http://trondheim.com/](http://trondheim.com/)).

NTNU is committed to following evaluation criteria for research quality according to [The San Francisco Declaration on Research Assessment - DORA](https://www.cos.io/dora/).
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.

Chinese applicants are required to provide confirmation of Master Diploma from China Credentials Verification (CHSI).

Please refer to the application number 2020/11710 when applying.

**Application deadline: 24.05.2020.**

**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 Mathematical Sciences**

We are Norway’s largest university environment in mathematical sciences. The Department has a particular responsibility for all basis education in mathematical sciences for engineering and natural science students at NTNU. We focus on long-term basic research and applied research at a high international level.

Our aim is to meet the society’s needs for mathematical and statistical expertise in business and public administration as well as in the research and education sector. [The Department of Mathematical Sciences](#) is one of seven departments in the [Faculty of Information Technology and Electrical Engineering](#).

Jobbnorge-ID: 186470, Søknadsfrist: 24. mai 2020