UiT The Arctic University of Norway
Department of Electrical Engineering

Jobbnorge ID: 276373
Deadline: 4/10/2025
Website: https://uit.no/startsida
Scope: Fulltime
Duration: Fixed Term

Faculty of engineering science and technology

PhD Fellow in radar technology for in-orbit detection of space debris

The position

A PhD position is available at the Department of electrical engineering, Faculty of engineering science and technology with the research group Electromechanical systems, within the field of radar technology.

The position is for a period of four years. The nominal length of the PhD programme is three years. The fourth year is distributed as 25 % each year and will consist of teaching and other duties. The objective of the position is to complete research training to the level of a doctoral degree. Admission to the PhD programme is a prerequisite for employment, and the programme period starts on commencement of the position.

The position will be affiliated with the Department of electrical engineering, and the PhD candidate will be part of the research group Electromechanical systems. The research group conducts applied research in fields such as remote sensing, communications technology, autonomous platforms, power electronics, energy systems and advanced control.

More information on the research group can be found here: https://uit.no/research/elsys.

The engagement is to be made in accordance with 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.

The workplace is at UiT in Narvik. You must be able to start in the position within a reasonable time after receiving the offer.

The position's field of research

Space debris is a rising threat to satellites and humans in orbit. Even small pieces of debris can cause major damage or failure of satellites, which has led several organisations to focus on monitoring and modelling of the situation. This includes organisations such as the Norwegian space agency, ESA Space Debris, NASA and U.S. intelligence.

Space debris varies in size and shape and includes everything from old satellites and rockets to smaller objects of around 100 micrometres. It is estimated to be over 131 million objects larger than 1 millimetre in space classified as debris. Some of this can be detected from the ground, and according to ESA space debris by the numbers, we are currently tracking around 37.000 of these objects. It is however not currently possible to detect space debris smaller than 3 millimeters using ground-based measurements.

The announced PhD position relates to the project "QBDebris: A CubeSat formation for space debris characterisation", funded by the Norwegian Research Council. The project aims to demonstrate the use of commercial off-the-shelf radars on satellites in-orbit to characterise and record the orbital elements of space debris smaller than the ground detection limit (3.2mm).

More information on the project can be found here: https://uit.no/project/qbdebris.

The PhD candidate is expected to work on theoretical and experimental studies both related to radars of the type currently being developed, future radars and how one potentially could use them in-orbit to gather high quality data. Furthermore, the candidate will work on theoretical aspects of how one would for instance use three or more satellites in a formation to measure all the orbital elements of the space debris particles. The main objective is to explore the theoretical and algorithmic possibilities available for doing in-orbit detection of space debris using millimeter wavelength frequency modulated continuous wave radars. These radars are commonly used in automotive and industrial applications, and offer great flexibility in for instance chirp configuration, detection modes, wavelength choices and antenna designs. The reason to put such a radar in space, is that it reduces the power need due to the R^{-4} relation of the returned power with distance (R). Another is that the scattering cross-section is proportional to λ^{-2}, favoring shorter wavelength radars. These will be millimeter wavelengths, which are attenuated but the Earth's atmosphere, thereby requiring them to be placed in space.

The research for this position focuses on:

- Theoretical studies on in-orbit radar applications, both for mounting on single satellites as well on satellites operating in formation
- Development and testing of radars for space debris detection and characterisation

- Data processing and analysis

Contact
For further information about the position, please contact associate professor Pål Gunnar Ellingsen:

- email: pal.g.ellingsen@uit.no

Qualifications
This position requires a master's degree or equivalent in electronics, aerospace engineering, satellite technology, space physics, applied physics or other relevant disciplines, and any other requirements. If you are near completion of your master's degree, you may still apply.

Applicants must document fluency of in English and be able to work in an international environment. Nordic applicants can document their English capabilities by attaching their high school diploma. Working knowledge of Norwegian or a Scandinavian language is also beneficial.

In addition, knowledge and training in the following fields are desirable:

- Radars
- Data processing
- Programming (for instance C++)
- Mathematics

Knowledge of these needs to be documented, and GPA (grade point average) and translation rules for the European Standardized Character System must follow the application.

Moreover, knowledge in electronics, communication technology, scientific writing or previous publications on a relevant topic is considered an advantage.

Applicants must document proficiency in Norwegian, Swedish or Danish at a minimum of level A2. If the candidate does not document proficiency in Norwegian, Swedish or Danish at level A2, then the doctoral fellow must complete a language course equal to 15 ECTS before the end of the fixed-term period. UiT will facilitate this.

The applicant must present a short essay (max 1 page, excluding references) on the proposed work for the PhD. The proposed work must be in accordance with the above description of the QBDebris project. The essay should outline the applicant's area of interest and motivation for completing a PhD at UiT in Narvik.

In the assessment, the emphasis is on the applicant's potential to complete a research education based on the master's thesis or equivalent, and any other scientific work. The essay will also be considered. In addition, other experience of significance for the completion of the doctoral programme may be given consideration.

We will also emphasize motivation and personal suitability for the position. We are looking for candidates who:

- Have good collaboration skills
- Have good communication and interaction with colleagues and students
- Wants to contribute to a good working environment

As many people as possible should have the opportunity to undertake organized research training. If you already hold a PhD or have equivalent competence, we will not appoint you to this position.

Admission to the PhD programme
For employment in the PhD position, you must be qualified for admission to the PhD programme at the Faculty of Engineering Science and Technology and participate in organized doctoral studies within the employment period.

Admission normally requires:

- A bachelor's degree of 180 ECTS and a master's degree of 120 ECTS, or an integrated master's degree of 300 ECTS.
- A master's thesis with a scope corresponding to at least 30 ECTS for a master's degree of 120 ECTS.
- A master's thesis with a scope corresponding to at least 20 ECTS for an integrated master's degree of 300 ECTS.

In order to gain admission to the programme, applicants with a background from a Norwegian institution should have a minimum grade of C on their master thesis and a weighted grade average of 3.0 for the last two years of their master programme. A more detailed description of admission requirements can be found here.

If you are employed in the position, you will be provisionally admitted to the PhD programme. Application for final admission must be submitted no later than **two months** after taking up the position.

Applicants with a foreign education will be subjected to an evaluation of whether the educational background is equal to Norwegian higher education, following national guidelines from Norwegian Directorate for Higher Education and Skills. Depending on which country the education is from, one or two additional years of university education may be required to fulfil admission requirements, e.g. a 4-year bachelor's degree and a 2-year master's degree. UiT normally accepts higher education from countries that are part of the Lisbon Recognition Convention.

Inclusion and diversity
UiT The Arctic University of Norway is working actively to promote equality, gender balance and diversity among employees and students, and to create an inclusive and safe working environment. We believe that inclusion and diversity are a strength, and we want employees with

different competencies, professional experience, life experience and perspectives.

If you have a disability, a gap in your CV or immigrant background, we encourage you to tick the box for this in your application. If there are qualified applicants, we invite at least one in each group for an interview. If you get the job, we will adapt the working conditions if you need it. Apart from selecting the right candidates, we will only use the information for anonymous statistics.

We offer

- Involvement in an interesting research project
- Good career opportunities
- A good academic environment with dedicated colleagues
- Flexible working hours and a state collective pay agreement
- Pension scheme through the state pension fund
- PhD Fellows are normally given a salary of 536 200 NOK/year with a 3% yearly increase

Norwegian health policy aims to ensure that everyone, irrespective of their personal finances and where they live, has access to good health and care services of equal standard. As an employee you will become member of the National Insurance Scheme which also include health care services.

More practical information about working and living in Norway can be found here: https://uit.no/staffmobility

Application

Your application must include:

- Cover letter explaining your motivation and research interests
- CV
- Official diplomas for bachelor's and master's degree
- Official transcript of grades/academic records for bachelor's and master's degrees
- Explanation of the grading system for foreign education (Diploma Supplement if available)
- Documentation of English proficiency
- Documentation of proficiency in Norwegian or a Scandinavian language (if available)
- Documentation of proficiency in Norwegian, Swedish, or Danish at a minimum of level A2 (if available)
- 2-3 references with contact information
- Master’s thesis, and any other academic works
- Essay (max 1 page, excluding references)

Qualification with a master’s degree is required before commencement in the position. If you are near completion of your master’s degree, you may still apply and submit a draft version of the thesis and a statement from your supervisor or institution indicating when the degree will be obtained. You must still submit your transcript of grades for the master’s degree with your application.

All documentation to be considered must be in a Scandinavian language or English. Diplomas and transcripts must also be submitted in the original language, if not in English or Scandinavian. If English proficiency is not documented in the application, it must be documented before starting in the position. We only accept applications and documentation sent via Jobbnorge within the application deadline.

Assessment

The applicants will be assessed by an expert committee. The committee's mandate is to undertake an assessment of the applicants' qualifications based on the written material presented by the applicants, and the detailed description draw up for the position. A copy of the assessment report will be sent to all applicants.

The applicants who are assessed as best qualified will be called to an interview. The interview should among other things, aim to clarify the applicant’s motivation and personal suitability for the position.

General information

The appointment is made in accordance with State regulations and guidelines at UiT. At our website, you will find more information for applicants.

The engagement is to be made in accordance with 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.

After the appointment you must assume that there may be changes in the area of work.

Remuneration for the position of PhD Fellow is in accordance with the State salary scale code 1017. A compulsory contribution of 2 % to the Norwegian Public Service Pension Fund will be deducted. You will become a member of the Norwegian Public Service Pension Fund, which gives you many benefits in addition to a lifelong pension: You may be entitled to financial support if you become ill or disabled, your family may be entitled to financial support when you die, you become insured against occupational injury or occupational disease, and you can get good terms on a mortgage. Read more about your employee benefits at: spk.no.

A shorter period of appointment may be decided when the PhD Fellow has already completed parts of their research training programme or when the appointment is based on a previous qualifying position PhD Fellow, research assistant, or the like in such a way that the total time used for research training amounts to three years.

We process personal data given in an application or CV in accordance with the Personal Data Act (Offentleglova). According to the Personal Data Act information about the applicant may be included in the public applicant list, also in cases where the applicant has requested non-

disclosure. You will receive advance notification in the event of such publication, if you have requested non-disclosure.

Eallju - Developing the High North

UiT The Arctic University of Norway is a multi-campus comprehensive university at the international forefront. Our vision is to be a driving force for developing the High North. The Northern Sami notion eallju, which means eagerness to work, sets the tone for this motive power at UiT. Along with students, staff and the wider community, we aim to utilise our location in Northern Norway and Sápmi, our broad and diverse research and study portfolio and interdisciplinary advantage to shape the future.

Our social mission is to provide research-based education of high quality, perform artistic development and carry out research of the highest international quality standards in the entire range from basic to applied. We will convey knowledge about disciplines and contribute to innovation. Our social mission unites UiT across various studies, research fields and large geographical distances. This demands good cooperation with trade and industry and civil society as well as with international partners. We will strengthen knowledge-based and sustainable development at a regional, national and international level.

Academic freedom and scientific and ethical principles form the basis for all UiT’s activities. Participation, co-determination, transparency and good processes will provide the decision-making basis we need to make wise and far-sighted priorities. Our students and staff will have the opportunity to develop their abilities and potential. Founded on academic integrity, we will be courageous, committed and generous in close contact with disciplines, people and contemporary developments.

We will demonstrate adaptability and seek good and purposeful utilisation of resources, so we are ready to meet the expectations and opportunities of the future. We will strengthen the quality and impact of our disciplines and core tasks through the following three strategic priority areas.

Additional information

Place of service:

Lodve Langes gate 2 8514 Narvik (Narvik Municipality)