UiT The Arctic University of Norway
Department of Physics and Technology

Jobbnorge ID: 267572
Deadline: 11/6/2024
Website: https://uit.no/startsida
Scope: Fulltime
Duration: Fixed Term

Faculty of Science and Technology

PhD Fellow in Nanophotonic On-Chip Sensor for Broadband Mid-Infrared Spectroscopy

The position

The Department of Physics and Technology, at UiT The Arctic University of Norway, offers a 3-year PhD position in **N**anophotonic On-Chip Sensor for Broadband Spectroscopy**.** UiT is an international and multidisciplinary research university that addresses both fundamental and applied problems in life and science.

The position is a part of a larger European Project lead by Universite de Paris Saclay, which objective is to develop of a fully integrated trace gas sensor based on nanophotonic waveguides and on-chip frequency combs. The position combines basic research in photonics and spectroscopy with field applications, good remuneration, and a great work environment within the stunning landscape of Tromsø.

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 workplace is at UiT in Tromsø. You must be able to start in the position within a reasonable time after receiving the offer. Starting date around January 2025 or earlier would be preferable.

The position's field of research

The research team led by Prof. Jana Jágerská focuses on the development, fabrication and testing of novel photonics concepts for on-chip spectroscopy. Mid-infrared spectroscopy is a nearly universal way to identify chemical and biological substances with high accuracy, by probing their absorption fingerprints in the mid-infrared range (3 to 15 μm). Using this method, high-end spectroscopic gas sensors that supply data for climate and space research have detection limits at ppt levels, i.e., they can detect one molecule of target gas among one trillion of other molecules. Our aim is to develop sensors on a photonic chip, whose performance is similar, but the external size is drastically smaller. Such chip-scale waveguide sensors can make Mid-infrared spectroscopy both cost-effective, scalable, and available for networks, remote, and unmanned applications.

We have recently demonstrated several novel and promising photonic concepts for on-chip trace gas detection, including mid-infrared sensors based on ultra-thin free-standing photonic waveguides. The next task is to integrate the waveguide sensors with dedicated light sources and detectors and demonstrate the first-of-its-kind integrated spectrometer. This is the objective of the EU Pathfinder Open Project UNISON, which unites leading European groups from France, Switzerland, Italy, Austria, and Norway.

Being a part of a large international scientific team, the main task for this position is be to design, fabricate and optimize waveguide sensors to be both sensitive and compatible with Ge and SiGe material platform used in UNISON. The successful candidate will also collaborate towards integration with active sources (Mid-IR frequency combs based on cascade laser diodes such as ICLs and QCLs) and detectors (ICDs and QCDs) and testing of the full system for sensitive CH4, CO2, and N2O detection.

The work location is mainly Tromsø, Norway, with extended research stay(s) in Paris.

Want to know more?
Learn about our research group and projects here

LinkedIn page of the UNISON project can be found here

What will you do?

The main tasks will involve:

- Conceptual design and numerical simulation of the device, using commercially available software
- Fabrication of the device in cleanroom facilities in Norway (NTNU Nanolab) and Paris (C2N cleanroom), including process optimization and structural characterization.

- Collaboration with our partners to integrate key elements onto a single photonic platform.
- Testing of both sensing chips and integrated prototypes for sensitive trace gas spectroscopy, benchmarking agains existing spectrometers/sensors.

The candidate is expected to take a leading role in the project, actively collaborate with other team members, prepare scientific papers and present results at international conferences, coordinate collaboration with partners, and participate in dissemination and potentially commercialization of the results. 1-2 research stays of 3-6 month duration in Paris are planned during the appointment period.

Qualifications

You must have a masters degree (equivalent to a Norwegian master's degree) in experimental physics, micro-/ nanotechnology, photonics, or similar programs.

The suitable candidate must have:

- Solid background in experimental physics
- Hands-on experience in an optical or photonic laboratory and experience with relevant measurement techniques and instrument control
- Excellent command of English, both orally and in writing. Nordic applicants can document their English capabilities by attaching their high school diploma.
- Good management and organization skills
- A high degree of independence, initiative, and commitment

In addition, it is of advantage that the applicant has:

- Background in optics and photonics and prior experience with optical waveguides
- Experience with gas sensors and IR spectroscopy
- Good programming skills (LabView, Python)
- Strong written and oral communication skills

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. 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.

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 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, or an integrated master's degree.

UiT normally accepts higher education from countries that are part of the Lisbon Recognition Convention.

In order to gain admission to the programme, the applicant must have a grade point average of C or better for the master’s degree and for relevant subjects of the bachelor’s degree. 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

- A unique opportunity to join an international team of top European experts in the field of Mid-infrared photonics, and develop the first on-chip trace gas spectrometer of great scientific and commercial value.
- Possibility to use advanced technological infrastructure in Norway and Paris with the ability of free training
- Mentoring by leading researchers
- Contribute to scientific publications and patents
- Flexible working hours and a state collective pay agreement
- Pension scheme through the state pension fund

- PhD Fellows are normally given a salary of 532 200 NOK/year with a 3% yearly increase
- If you have to relocate to Tromsø then the Faculty of Science and Technology may reimburse your moving costs. Further details regarding this matter will be made available if you receive an offer from us.

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 (max 1 page)
- CV (max 2 pages)
- Diploma for bachelor's and master's degree
- Transcript of grades/academic record for bachelor's and master's degree
- Explanation of the grading system for foreign education (Diploma Supplement if available)
- Documentation of English proficiency
- 3 references with contact information, including your master thesis supervisor.
- Publication record (max 1 page) with the description of your contribution. If relevant to the current application, publications should be highlighted and relevance described.
- Description of your past research activities/projects and their relevance to the current application (max 1 page)
- Master's thesis (or draft of thesis).

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.

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.

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

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