Postdoctoral Research Fellow Nanotechnology and optical nanoantennas for trapping and Raman-spectroscopy

The position

The Department of Physics and Technology announces a vacant position as a Postdoctoral Research Fellow for three years in Tromsø. The position is attached to the project “On-chip Raman-spectroscopy of extracellular vesicles.” The goal of this project is to develop high throughput chemical analysis of extracellular vesicles (EVs) and facilitate medical research on EVs using the system developed. Dielectric optical waveguides and optical nanoantennas will be used for optical trapping and Raman-spectroscopy of the EVs, and the Postdoctoral Research Fellow will be in charge of developing the optical nanoantennas.

Appointment to the position of Postdoctoral Research Fellow is mainly intended to provide qualification for work in top academic positions. It is a prerequisite that the applicant is able to carry out the project over the full course of the employment period. No person may hold more than one fixed-term position as a Postdoctoral Research Fellow at the same institution.

The project and Ultrasound, Microwaves and Optics group

The position is formally attached to the Ultrasound, Microwaves and Optics group of the Department of Physics and Technology, which has the strongest track record in optical waveguide technology in Norway, and currently involves 30-40 people, 70% of them from abroad. Its research is at the forefront in the areas of super-resolution imaging using nanophotonic waveguides and optical sensor technology. The team of Prof. Olav Gaute Hellesø mainly works on optical waveguides, and has a track record on optical trapping using waveguides and Raman-spectroscopy of trapped particles.

Extracellular vesicles (EVs) are tiny particles released from biological cells (diameter approx. 100 nm). EVs can circulate in the body, while cells are mostly fixed in tissue. EVs are considered a mechanism for communications between cells, allowing cells to exchange proteins, lipids and genetic material. Elevated levels of EVs have been associated with several disease states such as atherosclerosis, diabetes, cancer, arterial cardiovascular diseases and venous thromboembolism. EVs thus contain information about the cells in the body. This information can be revealed by characterising the EVs in a drop of blood. New methods to characterise and analyse EVs are essential to understand the biological functions of these vesicles, and to develop new clinical methods involving their use and/or analysis.

The aim of the project is to develop high throughput chemical analysis of EVs and facilitate medical research on EVs using the proposed new system. An optical chip will be developed to characterise the EVs using Raman-spectroscopy. One or a few EVs will be held by optical forces for long enough to analyse them. This will be done at several sites on the chip, using light from a single laser. The chip will be connected with a bundle of optical fibres to an optical spectrometer, that will acquire the Raman-spectra from the EVs. Based on the Raman-spectra, chemical information about the EVs can be obtained. The system will allow many EVs to be analysed at the same time, and thus make it a high throughput system.

Two research groups in medical biology participate in the project and will use the system developed for research on venous thromboembolism and novel antimicrobial molecules. The project will also include two PhD-students, visiting students, master-degree students, and collaboration with Univ. of Southampton, UK, and Univ. of Twente, Netherlands.

The position's field of research

The main task of the post-doc will be to develop and characterise the nanoantennas on silica waveguides, using maskless and e-beam lithography, and inductively-coupled reactive-ion etching (ICP-RIE). Most of the work will be performed in the new cleanroom of the department, which is planned to open in Oct. 2020. The post-doc will be involved in all aspects of the project, notably optical trapping and Raman-spectroscopy using the nanoantennas. The working hours will be utilised for research, co-supervision of two PhD students, and dissemination of results in peer-reviewed journals and conferences. Short (weeks) research stays abroad are planned as part of the project.

Contact

Further information about the position and UiT is available by contacting Prof. Olav Gaute Hellesø by email olav.gaute.helleso@uit.no or telephone +47 776 45297.

Qualifications

The position requires a Norwegian doctoral degree in physics, nanotechnology or a similar field, or a corresponding foreign doctoral degree recognised as equivalent to a Norwegian doctoral degree. Priority will be given to candidates who have completed their doctoral degree no more than five years before the application deadline, unless special circumstances exist.
Other requirements include:

- Solid background in experimental optics or nanotechnology
- Prior experience in processing and patterning for nanotechnology or optical waveguides
- Preferably experience with reactive-ion etching (RIE) and developing RIE-based processes
- Preferably experience with design, fabrication and characterisation of nanooptics or optical waveguides
- Some experience with optical trapping or Raman-spectroscopy is appreciated
- Excellence in previous work and good track record
- Self-motivation, independence and creativity
- Excellent work ethic and commitment to the job
- Excellent command of English, both written and verbal

Interest in Norwegian language and culture is welcome.

The assessment will also emphasise the candidate’s potential for research, motivation, independence and personal suitability for the position.

Qualification with a PhD is required before commencement in the position. If you’re at the final stages of your PhD, you may still apply if you have submitted your PhD thesis for evaluation within the application deadline. You must submit the thesis with your application and attach a statement from your supervisor concerning termination of your PhD studies. You should have dissertated before the preferred start-up date of the position.

At UiT we put emphasis on the quality, relevance and significance of the research work and not on where the work is published, in accordance with the principles of The San Francisco Declaration on Research Assessment (DORA).

UiT wishes to increase the proportion of females in academic positions. In cases where two or more applicants are found to be approximately equally qualified, female applicants will be given priority.

We offer

- An interesting project
- Scientific independence
- Good remuneration
- A fantastic work environment within the stunning landscape of Tromsø
- Good welfare arrangements for employees
- Good arrangements for pension, insurance and loans in the Norwegian Public Service Pension Fund

Towards the end of the project, time can be set aside to apply for research funding. Three previous post-docs in the group got ERC Starting Grants afterwards and are now permanently employed in the group.

The appointment is for a period of three years, with preferred start in autumn 2020. It is possible to apply the Research Council of Norway for a longer stay abroad (3 - 12 months), which will also extend the appointment period. Towards the end of the project, time can be set aside to apply for research funding. Three previous post-docs in the group got ERC Starting Grants afterwards and are now permanently employed in the group.

If you receive a personal overseas research grant from NFR it is possible to apply NFR for an extension of the fellowship period corresponding to the length of the stay abroad (minimum three months, maximum 12 months).

Application

The application must be submitted electronically via www.jobbnorge.no and shall include:

- Application/Motivation letter (max one page)
- CV (max two pages)
- Description of your past research projects and their relevance to the current application (max one page)
- Description of your academic production - highlighting three works that you consider most important for the current application (max. one page)
- Academic works, up to ten. The doctoral thesis is regarded as one work
- Diplomas and transcripts
- Three references, including the PhD supervisor

All documents must be in English or a Scandinavian language, diplomas and transcripts in English or a Scandinavian language. We only accept applications sent via www.jobbnorge.no.

We look forward to receiving your application!

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 successful candidate must be willing to get involved in the ongoing development of their department and the university as a whole.

The remuneration for Postdoctoral research fellow is in accordance with the State salary scale code 1352. A compulsory contribution of 2 % to the Norwegian Public Service Pension Fund will be deducted.

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. UiT and the Department will emphasize making the necessary adaptations to the working conditions for employees with reduced functional ability.
According to the Norwegian Freedom and Information Act (Offentleglova) information about the applicant may be included in the public applicant list, also in cases where the applicant has requested non-disclosure.

More practical information for working and living in Norway can be found here: Welcome to UiT!

UiT - Developing the high north

UiT is a multi-campus research university in Norway and the northernmost university of the world. Our central location in the High North, our broad and diverse research and study portfolio, and our interdisciplinary qualities make us uniquely suited to meet the challenges of the future. At UiT you can explore global issues from a close-up perspective.

Credibility, academic freedom, closeness, creativity and commitment shall be hallmarks of the relationship between our employees, between our employees and our students and between UiT and our partners.

Jobbnorge-ID: 185176, Søknadsfrist: 3. mai 2020