**UiT Norges arktiske universitet**

**Fakultet for naturvitenskap og teknologi - Institutt for fysikk og teknologi**

# PhD Candidate in "Multi-temporal remote sensing of dynamic Arctic phenomena"

## The position

The Department of Physics and Technology announces a vacant position of a PhD Candidate in the area of multi-temporal, model-supported remote sensing for Arctic applications.

The appointment is for a period of four years. The nominal length of the PhD program is three years. The fourth year is used for teaching or other duties for the department. The duties are normally distributed evenly over the four years.

The successful candidates will work at Centre for Integrated Remote Sensing and Forecasting for Arctic Operations (CIRFA). CIRFA conducts research on integrated remote sensing for Arctic operations by developing data analysis methods and technologies for reliably characterizing and monitoring the physical environment of the Arctic. The Centre also explores methods to efficiently assimilate the derived information into models to perform improved predictions of sea ice state, meteorological and oceanographic conditions. The project is associated with WP2, WP3, and WP5; WP2 conducts research within remote sensing of sea ice, WP3 within remote sensing of oil spills, and and WP5 within weather, ocean, and sea ice prediction as well as drift modelling. See more at http://cirfa.uit.no/

## The position's field of research

With the current availablity of multiple systems of polar orbiting Earth observation satellites, the capability of imaging dynamical phenomena has greatly improved. Remote sensing tasks like classification of drifting sea ice and the detection and characterization of marine oil-spills are dealing with the observation and information extraction of highly dynamic surface targets, i.e. objects with constantly changing locations and areal signatures. In this regard, the time dependent information, if properly used in the data analysis, should improve the effectiveness and reliability of remote sensing products. In ice charting, the use of past classifications can help to generate the next ice charts, and enable detection and characterization of deformation zones. This requires to consider ice movements.

In synthetic aperture radar (SAR), which will be a main sensor in the project, the information in an image is highly dependent on imaging geometry and meteorological conditions. Temporal analysis of classified sea ice scenes can increase understanding of changes in ice type signatures as function of varying environmental and imaging conditions. Similar scenarios can be envisioned in marine oil spill remote sensing. While the past dynamical behavior may be estimated step-wise from time series of the RS images, numerical models can provide continuous predictions of drift and deformation fields. Hence, the field of work of the announced position is to investigate how the combined use of image time series analysis and numerical drift modelling can improve accuracy and relyability in operational services producing sea ice charts and monitoring oil spills.

## Roles and responsibilities of the PhD Candidate

The PhD Candidate will work across several work packages in CIRFA: WP2 (Sea ice and iceberg remote sensing), WP3 (Oil spill remote sensing), and WP5 (Numerical modelling). It may also include WP1 (Ocean remote sensing) and WP7 (Pilot services).

The research should include:

- Application of segmentation/classification algorithms to locate the objects of interest in multiple images from synthetic aperture radars (SAR) and/or optical sensors.
- Application of past segmented/classified images to estmate current drift and/or deformation fields, and apply these to obtain "background" information for the next classification .
- Application of drift models to perform numerical predictions of future location and areal appearance of studied surface objects.
- System integration and performance assessment.

## Contacts

Further information about the position is available by contacting:

- Associate professor Anthony Paul Doulgeris, UiT: anthony.p.doulgeris@uit.no
- Professor Wolfgang Dierking, UiT: wolfgang.dierking@awi.de
- Professor Camilla Brekke, UiT: camilla.brekke@uit.no
- Professor Rune Gravesen, UiT: rune.gravesen@uit.no

## Qualifications

This position requires a Norwegian master degree in physics, mathematics/statistics, meteorology, oceanography or similar, or a corresponding foreign master degree recognised as equivalent to a Norwegian master degree.

The suitable candidate must have:

- Background in signal and image processing
- Experience with remote sensing data analysis (SAR and/or optical),
- Skills in programming
- Documented fluency in English is required

Knowledge of numerical modelling in meteorology and/or oceanography, pattern recognition and big data processing, plus previous experience in applications related to oil spills, sea ice or icebergs would be advantageous.

Other required qualification skills include:

- Independence and self-motivation
- Creativity and ability to think outside the box
- Excellent work ethics and commitment to the job
- International experience is an advantage. Empasis is also given to personal suitability.

The position requires admission to the PhD programme. Information about requirements and the PhD programme is available here: https://uit.no/nt/phd

During this assessment process, emphasis will be put on your potential for research as shown by the Master's thesis and any other academic works. In addition, we may consider work experience or other activities of significance for the PhD studies.

## We offer

We offer an interesting project within a highly invovative centre environment, opportunities to travel and meet other leading scientists within the field, independence in work, a fantastic work environment with nice colleagues, good remuneration, and a cosy hometown of Tromsø surrounded by the stunning landscape of Northern Scandinavia.

## Terms of employment

Remuneration of PhD positions are in salary code 1017, and normally start at salary grade 51 on the pay scale for Norwegian state employees. There is a 2% deduction for contribution to the Norwegian Public Service Pension Fund.

UiT has good welfare arrangements for employees, including beneficial arrangements for pension, insurances and loans in the Norwegian Public Service Pension Fund.

You have to be qualified for and participate in our PhD study program. As many as possible should have the opportunity to undertake organized research training; thus if you already hold a PhD, or have equivalent competence, we will not appoint you to this position.

More information about moving to Norway: http://uit.no/mobility

## Application

Your application must include:

- Application an motivation letter (max 1 page)
- CV (max 2 pages)
- Description of your academic production (any publicatons).
- Diplomas and transcripts (diploma supplement) for both bachelor and master level education
- Documentation of English language proficiency
- Master's thesis and any other academic works, up to five. The master thesis is regarded as one work.
- Three references, preferably including the master thesis supervisor

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 document completion of your degree before commencement in the position.

Documentation has to be in English or a Scandinavian language. We only accept applications through Jobbnorge.

## General

We make the appointment in accordance with the regulations in force concerning State Employees and Civil Servants, and guidelines at UiT. At our website, you will find more information for applicants.

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. UiT 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.

## UiT The Arctic University of Norway

**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.

**Department of Physics and Technology**

The Department of Physics and Technology consists of six research groups: (1) Complex Systems Modelling,(2) Earth Observation, (3) Energy and Climate, (4) Machine Learning, (5) Space Physics, and (6) Ultrasound, Microwaves and Optics (UMO). The department provides education on the Bachelor, Master, and PhD levels, and comprises 22 permanent scientific positions and a technical/administrative staff of 12 persons.

Jobbnorge-ID: 171379, Søknadsfrist: Avsluttet