Job Title: Internal Research Fellow (PostDoc) in Artificial Intelligence for Earth Observation

Req ID **8731** - Posted **22/08/2019**

EUROPEAN SPACE AGENCY

Research Fellow opportunity in the Directorate of Technology, Engineering and Quality.

ESA is an equal opportunity employer, committed to achieving diversity within the workforce and creating an inclusive working environment. Applications from women are encouraged.

Post

Internal Research Fellow (PostDoc) in Artificial Intelligence for Earth Observation

This post is classified F2 on the Coordinated Organisations' salary scale.

Location

ESTEC, Noordwijk, The Netherlands

Description

These two research fellowships will be shared among the European Space Agency's establishments ESTEC and ESRIN, and the Directorate of Technology, Engineering and Quality and the Directorate of Earth Observation Programmes.

In this way, the Research Fellows would benefit from the blue-sky, more theoretical and algorithmic focus of the Advanced Concepts Team (in ESTEC) during the first year, in view of transitioning this research into proof of concepts and applications to the remote sensing, benefitting from the Earth observation technical and market competence available at the Φ-lab (in ESRIN)

In the first year, the Research Fellows will be based in the Advanced Concepts Team (ACT), a team of research fellows (post-docs) and young graduates who originate from a broad variety of academic fields. Its task is to monitor, perform and foster research on advanced space systems, innovative concepts and working methods. It interacts externally almost exclusively with academia and operates as a truly interdisciplinary team bound to high scientific standards. Via its research, the team acts as a cross-departmental pathfinder to explore novel, potentially promising areas for ESA and the space sector, ranging from applied to basic fundamental research topics.

During the second year, the Research Fellows will be based in the Φ-lab, with the mission is to accelerate the future of Earth observation, by helping Europe's Earth observation and space researchers and companies adopt disruptive technologies and methods. In this second year the Research Fellow will be embedded into an application oriented environment where the ideas, methods and algorithms conceived in the first year can deliver a concrete contribution to Earth Observation.

Candidates are highly encouraged to get familiar with the research done by the ACT (https://www.esa.int/gsp/ACT/), in particular in the field of artificial intelligence and computer science as well as with the phi-lab blog (http://blogs.esa.int/philab/).

Field(s) of activities/research

The successful candidates will carry out research in the field of Artificial Intelligence with a particular emphasis on developing new methods applicable to Earth Observation. Areas of research are partly chosen by the successful candidates based on his/her own expert judgements and insight into trends and developments, and partly chosen by the team as to follow strategic directions of the Agency.

Scientifically she/he will in particular:

- Propose and perform research in the field of Artificial Intelligence, where appropriate together with universities of ESA Member States (in particular through the Ariadna scheme);
- Organise and lead competitions on proposed topics via the European Space Agency's kelvins platform (https://kelvins.esa.int);
- Apply and further develop techniques from Deep Learning (Autoencoders, CNNs, etc…) to hyperspectral image processing and related tasks;
- Contribute or start the open source development of tools and models applicable to satellite image super-resolution, image segmentation, cloud detection, prediction of climate factors, disaster response, settlements detection and similar;
- Analyze the applicability of transfer learning, one-shot learning and data fusion on space data;

As ACT researcher, she/he will:

- Publish results in peer-reviewed publications and use modern communication tools to communicate with the broader audience inside and outside ESA;
- Lead and assist interdisciplinary projects with other ACT researchers;
- Participate together with the team in the assessment of proposed space system concepts - these not being restricted only to artificial intelligence and computer science - and propose new concepts and assessment studies; and
- Perform and participate in assessments on subjects of strategic interest of ESA, provide in- house expertise to strategy development.
- Benefit for her/his research from the technology and engineering expertise available at ESTEC.

In the second year, as a member of the Φ-lab, she/he will:

- Transfer findings and projects results into a more applicative environment, based on the research performed during the first year and in close coordination with the Φ-lab, its resources and its strategic directions.
- Embed his project into an early prototype project, fully benefit from the direct access to EO expertise available at the Φ-lab and in ESRIN.

Technical competencies
Knowledge relevant to the field of research
Research/publication record
Ability to conduct research autonomously
Breadth of exposure coming from past and/or current research/activities
General interest in space and space research
Ability to gather and share relevant information

Behavioural competencies
Innovation & Creativity
Continuous Learning
Communication
Teamwork
Self Motivation
Problem Solving

Education
Applicants must have obtained a degree in either artificial intelligence, computer science, mathematics or engineering. The applicants must hold a PhD (completed before take up of duty) on AI, Computer Science or Machine Learning, subject of the thesis being relevant to the description of the tasks outlined above and aim at an academic/research career.

Additional requirements
- Experience in applying deep neutral networks;
- Proficiencyin C++ and Phyton programming languages;
- Experiences in open source projects, GPU programming, distributed computing and cloud computing are considered as strong assets;
- Ability for and interest in prospective interdisciplinary research;
- Aptitude to contextualise specialised areas of research and quickly assess their potential with respect to other domains and applications;

- Academic networking to add functioning links to universities and research institutes;
- Ability to work in a team, while being able to work individually regarding his/her own personal research plans and directions;
- Natural curiosity and a passion for new subjects and research areas.

Specificities

The Research fellows will have access to Φ-lab's 10 visiting AI professors

The position of Research Fellow at ESA's Advanced Concepts Team is similar to a regular academic Post-Doc placement, however with a few notable key differences:

1. ACT RFs have no teaching obligations. However, they will likely be involved in the mentoring of Young Graduate Trainees and stagiaires (student interns) within the team.
2. As the team does not have a professor-like position, ACT RFs are academically more independent than most post-docs. This implies more freedom but also more responsibility for their research directions and approaches.
3. ACT RFs are joining a diverse, changing and interdisciplinary research team embedded in a large space agency, in contrast to a more specialised, focused research group with close or similar competences.
4. ACT RFs need to actively reach out to other disciplines, to bring in their competences to interdisciplinary research projects and to encourage other researchers to join them in their core research projects (research at the intersections of disciplines).
5. ACT RFs need to communicate their expertise and research results internally and externally, including potential implications and importance for ESA's long-term strategy.

Other information

For behavioural competencies expected from ESA staff in general, please refer to the ESA Competency Framework.

The Agency may require applicants to undergo selection tests.

 The closing date for applications is 19 September 2019.

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research. Candidates must also arrange for three letters of reference to be sent by e-mail, before the deadline, to temp.htr@esa.int. The letters must be sent by the referees themselves. The candidate's name must be mentioned in the subject of the email.

If you require support with your application due to a disability, please email contact.human.resources@esa.int.

Please note that applications are only considered from nationals of one of the following States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom and Canada and Slovenia.

According to the ESA Convention the recruitment of staff must take into account an adequate distribution of posts among nationals of the ESA Member States. Priority will first be given to internal candidates and secondly to external candidates from under-represented Member States when short-listing for interview.
(http://esamultimedia.esa.int/docs/careers/NationalityTargets.pdf)

In accordance with the European Space Agency's security procedures and as part of the selection process, successful candidates will be required to undergo basic screening before appointment