Job Title: Research Fellowship in Information Retrieval

EUROPEAN SPACE AGENCY

Research Fellowship Opportunity in the Directorate of 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

Research Fellow in Information Retrieval

Location

ESTEC (Noordwijk, The Netherlands)

Description

The Research Fellow will be based in the Advanced Concepts Team (ACT), a group of research fellows (post-docs) and young graduates who originate from a broad variety of academic fields and aim at an academic career. 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. An important task of the team is to communicate scientific trends and results, as input to the strategic planning of the Agency.

Information retrieval (IR) is finding media (documents, images, videos, etc…) from unstructured large collections to answer to ad hoc knowledge demands. The research field is closely related to information processing, natural language processing, and high performance computing. ESA produces large quantities of data (payloads data, telemetry, research and study results, administration documents).

The study and development of efficient IR algorithms and the adoption/development of advanced natural language processing techniques to extracting knowledge from those data is at the core of this fellowship.

Interested candidates are highly encouraged to visit the ESA website: www.esa.int/ESA

Field(s) of Activities/Research

The successful candidate will carry out research in the field of information retrieval systems with a particular emphasis on methods allowing enhancing decision support systems for proposal evaluation and rapid retrieval of scientific data. Areas of research are partly chosen by the successful candidate 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 information retrieval, where appropriate together with universities of ESA Member States (in particular through the Ariadna programme);
- Assess and investigate concepts and novel theoretical methods in information retrieval for synergies with ESA's activities;
- Support the development of an innovative decision support system for technology research and system study proposals.
- Leverage on open source tools (Apache Tika, clucene, etc.) and modern computer architectures (GPUs, multiple cores, etc.) to develop new concepts for efficient IR systems.
- Investigate the synergies of IR with emerging AI methodologies in natural language processing and evolutionary computing to bring forth a higher level of semantic understanding.
- Liaise with the ESA Φ-Lab focussed on innovative Earth Observation applications.

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.

Technical competencies (standard part for all ESA RF used as selection criteria – not to be modified)

Knowledge relevant to the field of research

Research record

Ability to conduct research autonomously

Breadth of exposure coming from past and/or current research

Interest in Space and space research (could be used in lieu of ESA knowledge and preparation for interview)

Ability to gather and share relevant information (can be used for evaluation jamboree/interview preparation)

Behavioural competencies (standard part for all ESA RF used as selection criteria – not to be modified)

Innovation and 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;
- 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.
- Proficiency in C++ and Python programming languages and experiences in open source projects (preferably Apache Tika and clucene), GPU programming, distributed computing and cloud computing are considered as strong assets.
- A well established and recognized role in the open source software development community

Additional Requirements

- 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 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 (footer) (HR part)

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 DD MM YYYY.

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 up to 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 as well as Bulgaria, Cyprus, Latvia, Lithuania, Slovakia as European Cooperating States (ECS).

Priority will first be given to candidates from under-represented Member States.

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.