Job Title: Internal Research Fellow (PostDoc) in Advanced Requirements Engineering for Space Systems

Req ID **8261** - Posted **12/11/2018**

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 Advanced Requirements Engineering for Space Systems

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

Location

ESTEC, Noordwijk, The Netherlands

Description

The Software Systems Division deals with development techniques for space systems, in particular in the functional domain. This covers all life-cycle aspects from requirements specification to development, verification and validation. It covers mission-critical software, with relevant software technology for flight as well as ground systems. Increased importance is being devoted to the Requirements Engineering (RE) process and, for the functional domain in particular, to the link between system and SW specifications. This highlights the importance of a well-controlled requirements engineering process at all levels.

Currently ESA spacecraft requirements are highly diverse across all projects, whereas they ought to be streamlined and made consistent, to reduce the industrial effort, make it more systematic and favour product lines. RE activities targeting the requirements content (as opposed to configuration management or exchange) look at possible ontologies. Creating ontologies from scratch is work-intensive, with no guarantee as to its feasibility currently. Instead, starting from existing requirement documents and trying to derive generic requirements from them could be more efficient. This has been done in the railway sector and also at NASA. It can be done using classic Natural Language Processing (NLP) techniques.

Artificial Neural Networks (ANN) can also be used to analyse natural language. For example, Hopfield networks or Restricted Boltzman Machine (RBM) can be used to classify requirements; (de-noising) auto-encoders can be used to capture the essence of the semantic for requirements; Deep Belief Networks (DBN) can be used to generate similar requirements; Deep Convolutional (Inverse Graphics) Networks (DC-IGN) can be used to rewrite requirements in harmonised ways.

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

Field(s) of activities/research

The Research Fellow's task will be to use ESA requirements documents (e.g. spacecraft's System Requirements Documents) as well as ECSS standards to exploit the Neural Network or related AI possibilities to analyse the

documents, generate a term glossary, classify the requirements accordingly, support their reorganisation and streamlining, and possibly regenerate them in the form of generic documentation of ESA missions.

Technical competencies

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

Behavioural competencies

Innovation & Creativity
Continuous Learning
Relationship Management
Self Motivation
Communication
Problem Solving
Cross-Cultural Sensitivity

Education

Applicants should have recently completed, or be close to completing, a PhD in computer science, modelling methods, or systems (requirements) engineering. Preference will be given to candidates awarded their doctorate within past five years.

Additional requirements

The working languages of the Agency are English and French. A good knowledge of one of these is required. Knowledge of another Member State language would be an asset.

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 10 December 2018.

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 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