Job Title: Internal Research Fellow (PostDoc) in Advanced Mission Analysis

Req ID **4963** - Posted **12/03/2018**

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 Mission Analysis

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

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.

The team has been working on improving fundamentals algorithms and methods to aid mission analysis since 2002, pioneering topics such as global optimization for trajectory design and differential algebra in orbital mechanics. Asteroid deflection, autonomous on orbit assembly, distributed control, active space debris removal were studied early-on by the team facilitating their understanding within the Agency.
Candidates are highly encouraged to get familiar with the research done in this field by the team (http://www.esa.int/gsp/ACT/mad/index.html) as well as on the overall research of the ACT and the main activities lines of ESA.

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 advanced mission analysis, intended as the use of non-traditional guidance, navigation and control techniques.
Areas of research are partly chosen by the successful candidate based on his/her own expert judgements and insight into trends and developments and motivation, 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 mission analysis, where appropriate together with universities of ESA Member States (in particular through the Ariadna scheme www.esa.int/ariadna).
- Explore synergies between global optimization techniques and low-thrust trajectory models or between differential algebra and guidance and navigation algorithms.
- Further develop open source software developed by the ACT and of use in advanced mission analysis: pygmo (optimization), pykep (astrodynamics), audi (differential algebra)
- Coordinate the team participation to competitions in the aerospace field including, but not limited to, the GTOC.

Provide support to all ACT scientific projects by proposing advanced mission analysis concepts and tools. Liaise with the ESA Concurrent Design Facility and the ESA Space Operations Centre in view of transferring knowledge on advanced mission analysis concepts and tools.

As ACT researcher, she/he will:
- Publish results in peer-reviewed publications and communicate research to broader audiences 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 and propose new concepts and assessment studies; and
- Perform and participate in assessments on subjects of strategic interest of ESA, and provide in-house expertise to strategy development.

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
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 PhD in either Celestial Mechanics or Aerospace Engineering, subject of the thesis being relevant to the description of the tasks outlined above and aim at an academic/research career.
A previous degree in either Engineering, Informatics, Computer Science or Celestial Mechanics is required.

Additional requirements
Applicants must have:

- Solid programming skills are mandatory, preferably C++ and Python;
- Experiences in open source projects and a proven open science attitude are an asset;
- Ability for and interest in prospective interdisciplinary research;
- Ability to contextualise specialised areas of research and quickly assess their potential with respect to other domains and applications;
- Academic networking bringing functioning links to universities and research institutes;
- Ability to work in a team, while being able to work individually on his/her own personal research plans and directions;
- Natural curiosity and a passion for new subjects and research areas.

Other information
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:

- 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.
- 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.
- 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.
- ACT RFs need to actively reach out to other disciplines, to bring 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).
- ACT RFs need to communicate their expertise and research results internally and externally, including potential implications and importance for ESA's long-term strategy.

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 03 April 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.

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