

# Job Title: Internal Research Fellow (PostDoc) in Space Automation and Robotics

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## EUROPEAN SPACE AGENCY

Research Fellowship 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 Space Automation and Robotics

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

### Location

ESTEC, Noordwijk, The Netherlands

### Description

The Mechatronics and Optics Division provides engineering support for space projects and executes technology developments in the areas of automation and robotics, mechanisms, life and physical science instrumentation, optics and opto-electronics.

The Automation and Robotics Section is the ESA focal point for matters relating to the design, engineering and verification of space automation and robotic (A&R) systems (i.e. manipulation systems, mobility systems and payload automation systems).

In these domains, the Section is responsible for:

- conception of novel uses and designs for space missions
- definition, design and engineering
- breadboarding and demonstration
- analysis and verification
- technology development in the fields of: 1) robot perception 2) control, autonomy and intelligence 3) motion and actuation 4) robot-user interfacing 5) robot ground-testing.

The Automation and Robotics Section is supported in its activities by the Automation and Robotics Laboratories (ARL). Interested candidates are encouraged to visit the ESA website related to the Division's activities.

### Field(s) of activities/research

ESA's Automation and Robotics Laboratories (ARL) address the unique situation, in space technology, posed by robots in space. Unlike other spacecraft, robots interact with the space environment and other mission elements. Not only does the space environment affect the robot and potentially modify its behavior, but the robot also affects the environment through its behavior. All this happens in a complex and dynamic interaction which provides considerable potential for research.

Three sub-laboratories make up the ARL as follows:

#### **Orbital Robotics Lab (ORL) addresses the use of robots in free space where there is little or no gravity**

This Lab specializes in the use of robots in orbit (e.g. satellite/station servicing, debris removal) or in sampling in very low-gravity environments (e.g. Phobos, meteoroid, comet sampling). The Lab provides tools to support the research, development and validation of means to cope with proximity manoeuvring, free-space trajectory planning, navigation and localisation, free-floating contact dynamics and low-gravity sampling. As astronauts also face problems in contact dynamics and motion in free space, the ORL can also provide a physical simulation environment for astronaut training.

#### **Planetary Robotics Lab (PRL) focuses on robots roaming on the surfaces of the Moon and Mars**

This Lab specialises in addressing the challenges robotic probes face during exploration of the surface of the Moon and Mars, specifically in relation to motion. As a probe moves on a far planetary surface, it must have physical locomotion and navigation ability as well as logical autonomy. The Lab is equipped to study and support the research, development, validation and verification of all three aspects, as well as of rover control and monitoring stations.

### **Human Robot Interaction Lab (HRI) addresses the means of interaction between human and robots, whether remote or co-located**

This Lab supports the research, development and validation of human-robot interaction, in particular related to telerobotics, mechatronics and haptics. There are two main branches of human-robot interaction. The first is where the human operator is interacting remotely with the robot, i.e. telerobotics. The second is close proximity interactions, such as the donning of a robotic exoskeleton for the intuitive tele-operation of other robots for physical exercise, augmenting physical strength or rehabilitation. The Lab has proven competence in telerobotics applied to space missions, particularly with the use of haptic feedback, as well as a history of research and development in robotic exoskeletons for space use.

The selected candidate will carry out research in the various domains supported by the ARL and will have access to the labs and their resources.

### **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  
Interest in space and space research  
Ability to gather and share relevant information

### **Behavioural competencies**

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

### **Education**

Applicants should have recently completed, or be close to completion of a PhD in robotics. Preference will be given to applications submitted by candidates within five years of receiving their PhD.

### **Additional requirements**

The Research Fellow must be able to work in a team with other international investigators in a spirit of positive co-operation and, at the same time, be capable of working autonomously in his/her area of research. At the end of the fellowship, the Research Fellow will be required to summarize the work completed so that it can be included in papers to be submitted to specialised conferences/journals.

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 18 October 2017.**

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research in the "additional documents" field of the "application information" section. Candidates are asked to arrange for 3 reference letters, to be sent by the referees themselves, before the closing date to [temp.htr@esa.int](mailto:temp.htr@esa.int). Please ensure your name is mentioned in the subject of the e-mail.

If you require support with your application due to a disability, please email [contact.human.resources@esa.int](mailto:contact.human.resources@esa.int).

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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