

# Job Title: Internal Research Fellow (PostDoc) in Virtual Reality Lab for Lunar Surface representation

Job Requisition ID 10784 - Posted 03/10/2020



## EUROPEAN SPACE AGENCY

Research Fellowship Opportunity in the Directorate of Human & Robotic Exploration Programmes.

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 Virtual Reality Lab for Lunar Surface representation

This post is classified F2.

### Location

EAC, Porz-Wahn, Germany

### Our team and mission

You will be based at the European Astronauts Center and will be a part of the XR team (AR and VR); is composed of ESA staff, Research Fellows, Young Graduate Trainees/National Trainees and university student interns performing their final year projects in areas relevant to human spaceflight and exploration activities. The team works with associated agencies, institutions and other ESA facilities.

Within this framework, you will research all needed technologies and material to further expand the VORTEX (Virtual Reality for Lunar Exploration) project focused on accurately representing the lunar south pole surface for early depiction, science preparation, future operations and training usages utilizing the centers VR, haptics and potentially AR assets. You will use this platform to both further develop XR capability at EAC and objectively assess the efficacy of these technologies as preparatory tools for exploration scenarios.

Interested candidates are highly encouraged to visit the ESA website: [www.esa.int](http://www.esa.int) and the specific ESA VR/AR 2019 workshop <https://indico.esa.int/event/316/>

### Field(s) of activities/research

This work will pivot around the scientifically accurate representation of the lunar surface, to be utilized as a preparatory environment for exploration scenarios. You will be implemented to support lunar exploration, linked to ISS, robotics, and related training projects, as well as LUNA analogue facility. It is also anticipated that the research will include investigation on 3D models of the Moon Village elements, Artemis program and European Landers. Integration of new technologies (e.g. updates to game engines such as Unreal, haptics and next generation VR/AR systems)

You will engage closely with XR team members, subject matter experts of the training division, management support, robotics groups and LUNA project personnel in carrying out the following tasks:

- Investigating the usage of VR environments as a preparatory step for lunar exploration, from a research perspective, addressing the efficacy of such environments for testing/training in this context
- Leading the development, alongside XR-team personnel, of a representative virtual environment encompassing the lunar surface for use cases related to ESA and ISECG exploration scenarios
- Researching and presenting the most adequate engine, blueprints or hardware/software;
- Establishing and maintaining close contact with experts in the field from academia, private industry, and research institutions with a view to enhancing the project and XR-lab capability;
- Ensuring best accuracy through analyzing the user experiences (from scientists, management, trainers, operation team) related to lunar surface;
- Becoming familiar with EAC activities and related VR/AR projects especially for exploration;
- Contributing to the VORTEX project in VR being in line with:
  - Expected results to best depict the lunar surface and associated elements;
  - EAC VR roadmap;
  - The European Space Exploration Technology Roadmap;
- Developing projects relating to training and mission operations using VR/AR commercial off the shelf technology;
- Supporting ongoing development of VR/AR capability at EAC, both from an operational and outreach perspective;
- Publishing results/contribute to papers related to the aforementioned points, especially regarding the surface representation in VR and its utilization for lunar and planetary exploration.

## 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  
Relationship Management  
Self Motivation  
Problem Solving  
Cross-Cultural Sensitivity

## Education

You should have recently completed, or be close to completion of a PhD in a related technical or scientific discipline. Preference will be given to applications submitted by candidates within five years of receiving their PhD. In particular for this position, the following is required: PhD in computer science and/or VR/AR programming based on gaming engine.

## Additional requirements

Knowledge relevant to the field of activity. Skills relating to VR/AR development, relevant programming capability in this area and with relevant tools (e.g. Unreal/Unity). Proficiency in the use of Microsoft Office. You should also be able to integrate/suggest upgrade to the VR/AR hardware (currently wireless VIVE Pro) and the associated PCs, laptops, trackers and sensors.

Key competencies for these activities are programming and some skills relating to 3D visualization/modelling. Knowledge of at least one programming language, to understand control structure and design of a computer program. C++ knowledge is an asset. Having some experience working with a game engine (preferably Unreal Engine) is a must. Knowledge of git is an asset.

## Specificities

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

- You have no teaching obligations. However, you 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 formal professor-like position, RFs are academically more independent than most post-docs. This implies more freedom but also more responsibility for their research directions and approaches.
- You 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.
- You 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).
- You 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 01 November 2020.

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.

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, and the United Kingdom. Nationals from Latvia and Slovenia, as Associate Member States, or Canada as a Cooperating State, can apply as well as those from Bulgaria, Cyprus, Lithuania and 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