

Job Title: Internal Research Fellow (PostDoc) in In Situ Resource Utilisation Processes

Requisition ID 10761 - Posted 19/01/2021



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. For this purpose, we welcome applications from all qualified candidates irrespective of gender, sexual orientation, ethnicity, beliefs, age, disability or other characteristics. Applications from women are encouraged.

Post

Post Internal Research Fellow (PostDoc) in In Situ Resource Utilisation Processes

This post is classified F2.

Location

ESTEC, Noordwijk, The Netherlands

Our team and mission

The Research Fellow will be based in the SciSpace Team in the Research and Payloads Group and will work on electrochemical reduction of regolith and simulants to improve understanding of processes that might be used to produce oxygen and metals on the Moon. The Fellow will work closely with and supporting the ExPeRT Group on mission studies and other teams across ESA.

In Situ Resource Utilisation (ISRU) will be a core element of sustainable exploration on the Moon and Mars. The realisation of this must be underpinned by processes that convert the materials and chemistry found at these locations into usable products. In support of a wider effort to build up capability and knowledge in the domain, ESA has established an in-house research activity into electrochemical processes to reduce rocky materials to oxygen and metallic products. This largely laboratory based research effort also provides inputs to support the definition and development of possible future systems and payloads for use in space.

This Research Fellowship will focus on investigations into molten salt electrolysis for the reduction of lunar regolith. The research will also support mission and payload definition activities and work performed in collaboration with the newly established European Innovation Centre for Space Resources. The work builds on previous work performed within ESA in the last two years and will use analogue materials and potentially real lunar samples. Past activities have provided the basis both for ISRU payload studies and for ESRI investments and are the subject of collaborative research with academia.

Field(s) of activities/research

The Research Fellow will prepare and perform research into electrochemical reduction of extraterrestrial materials with a focus on the Fray-Farthing-Chen (FFC) process using reactor cells that have been built within ESA ESTEC. Experiments are envisaged that use alternative regolith and simulant source materials and observe the effects of different reaction variables on the efficiency of the process and the quality of the products produced.

The outcomes and expertise gathered through the research activities will be used to support the preparation of future mission and payload study activities and the Research Fellow may also contribute to this work.

Expected outcomes and benefits of the research include:

- building on previous investments in capability and infrastructure for in-house ISRU research within ESA;
- building internal knowledge and capabilities to support ISRU payloads and mission studies;
- creating a research link with the ISRU community and the European Innovation Centre for Space Resources (ESRIC);
- supporting coordination between different ESA teams;
- establishing tools and facilities that can be built on by future research fellows and which support the ESA programme;
- addressing knowledge gaps for future exploration;
- delivering scientific publications.

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.

Additional requirements

In particular for this position, the following is required:

- Experience in electrochemistry, metallurgy, materials science or a related discipline.
- Strong practical and experimental experience.

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 16 February 2021.

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.

At the Agency we value diversity and we welcome people with disabilities. Whenever possible, we seek to accommodate individuals with disabilities by providing the necessary support at the workplace. The Human Resources Department can also provide assistance during the recruitment process. If you would like to discuss this further please contact us at 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, 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