

## Internal Research Fellow (PostDoc) in Advanced Space Architectures

**Job Req ID:** 11898

**Closing Date:** 10 May 2021

**Publication:** External Only

**Vacancy Type:** Internal Research Fellow

**Date Posted:** 12 April 2021

Vacancy 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. 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.

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

### **Location**

ESTEC, Noordwijk, The Netherlands

### **Our team and mission**

This research fellowship will be carried out within ESA's Advanced Concepts Team (ACT) made up of research fellows (post-docs) and young graduates from a broad variety of academic fields and aiming 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 pathfinder to exploring novel, potentially promising areas for ESA and the space sector, ranging from applied to basic fundamental research topics. An important task is to communicate scientific trends and results as input to the Agency's strategic planning.

In the field of advanced space architectures, the ACT has undertaken research centred on advanced materials, habitat designs, in-situ resource utilisation (ISRU) and in-space manufacturing, primarily in the context of lunar and Martian settlements. Recent studies have focused on fibre-reinforced geopolymers from lunar regolith, fungi-based bio-composite structures, additive manufacturing of functionally-graded lunar materials, autonomous winding of fibre-based composite shells, and continuous basalt fibre production on the Moon.

Candidates are expected to have familiarised themselves with the research done by the ACT (<https://www.esa.int/gsp/ACT/>) in the field of space habitats and advanced materials and with all other related projects, as well as with the two special issues of the Acta Futura journal ([http://www.esa.int/gsp/ACT/resources/acta\\_futura](http://www.esa.int/gsp/ACT/resources/acta_futura)) on "Space Architecture" and "Interstellar Exploration".

### **Field(s) of activities/research/learning areas**

You will carry out multidisciplinary research in advanced space architectures, combining the architectural field with developments in computational design, robotic manufacturing, material science, synthetic biology, computer science and/or ecology. The focus of the research may lie

on different scale levels ranging from a complete (inter )planetary settlement system to habitats supporting infrastructure and materials.

Areas of research are chosen partly by you based on your own expert judgement and insight into trends and developments, and partly by the team in line with the Agency's strategic directions.

On the scientific side, you will in particular:

- Propose and perform novel research in materials for advanced space architectures, where appropriate together with ESA Member State universities (in particular through the Ariadna scheme <https://www.esa.int/ariadna>);
- Evaluate in-space manufacturing methods for their viability and propose the developments required to take such methods through to future implementation;
- Investigate and draw on terrestrial materials, manufacturing and architectural methods for their potential to be adapted into novel space contexts;
- Liaise with ESA colleagues outside the team on projects related to ISRU and space architecture;
- Monitor new developments in materials for space architecture by examining published research and networking with the research community.

As ACT researcher, you will:

- Publish results in peer-reviewed publications and use modern tools to communicate with the broader audience inside and outside ESA;
- Lead and assist interdisciplinary projects with other ACT researchers;
- Participate with the team in the assessment of proposed space system concepts - these not being restricted to space architecture - and propose new concepts and assessment studies;
- Perform or participate in assessments on subjects of strategic interest to ESA, and provide in-house expertise on strategy development.
- Benefit for your research from the technology and engineering expertise available at ESTEC.

### **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

Self Motivation

Problem Solving

Teamwork

### **Education**

You must have obtained:

- A degree in architecture, civil engineering, materials science or a related field.
- A PhD (completed before take-up of duty) in architecture, civil engineering, materials science (or another discipline with a solid materials/architecture focus), with the subject of the thesis being relevant to the tasks outlined above.

### **Additional requirements**

- Ability and interest in prospective interdisciplinary research;
- Aptitude for contextualising specialised areas of research and quickly assessing their potential with respect to other domains and applications;
- Academic networking to add functioning links to universities and research institutes;
- Ability to work in a team, while being able to work individually on your own personal research plans and directions;
- Natural curiosity and a passion for new subjects and research areas;
- Proficiency in computer programming and data analysis.

### **Specificities**

The position of Research Fellow in ESA's Advanced Concepts Team is similar to a regular academic post-doc placement, but with a few key differences:

1. ACT RFs have no teaching obligations. However, they are likely to be involved in mentoring Young Graduate Trainees and student interns within the team.
2. 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 greater responsibility for their research directions and approaches.
3. ACT RFs join 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.
4. 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).
5. ACT RFs need to communicate their expertise and research results internally and externally, including the 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 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. The Agency may require applicants to undergo selection tests.

**The closing date for applications is 10 May 2021.**

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](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).

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. When short-listing for an interview, priority will first be given to internal candidates and secondly to external candidates from under-represented Member States.  
 (<https://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.

Recruitment will normally be at the first grade in the band (A2); however, if the candidate selected has little or no experience, the position may be filled at A1 level.