Job Title: Internal Research Fellow (PostDoc) in ICME solutions for space-relevant manufacturing processes

Req ID **9705** - Posted **28/04/2020**

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 ICME solutions for space-relevant manufacturing processes
This post is classified F2.

Location

ESTEC, Noordwijk, The Netherlands

Description

The Materials and Processes Section provides functional support to ESA projects and carries out technological research (R&D) in the area of materials and associated manufacturing processes.

Field(s) of activities/research

The materials and processes used for space hardware manufacturing are confronted with very peculiar challenges and limitations: the omnipresent need for low mass must be met while also guaranteeing very high performance and reliability of the final product with no repair or maintenance option. Often small and complex geometries for operating in highly demanding mission environments are necessary. The industrial transition towards Industry 4.0 is introducing smart production capabilities through digitalisation and automation, enabling agility to react quickly to market needs and allowing unprecedented design solutions (e.g. additive manufacturing) as well as optimisation of cost, performance and time-to-market. In order not to compromise this agility through extensive and resource intensive testing and qualification, predictive modelling approaches are necessary, ultimately leading to a full digital twin of the manufacturing process and Integrated Computational Materials Engineering (ICME) solutions for performance prediction.
The objective of this research activity is to develop ICME solutions for space-relevant manufacturing processes (e.g. powder bed additive manufacturing) to fully understand the process-structure-performance relationship.

The ICME approach involves linking materials models at a multitude of scales, including:
- nanoscale at atomistic level such as molecular dynamics
- microscale such as phase formation and dislocations
- mesoscale at the level of repeating unit cells such as mechanical strength, fracture energy
- macroscale at continuum level such as mechanical performance and durability

The different scale models should be dynamically interactive and need to consider all manufacturing steps including possible post-processing as well as time and temperature effects after assembly during ground and orbital phases. Possible processes to be studied include powder or wire-based additive manufacturing, welding, soldering and composite technologies. The conclusion of this activity is expected to establish a foundation for predictive materials performance modelling, supporting the space industry’s transition towards agile manufacturing technologies.

You can expect to work in the following fields:
- multi-scale materials modelling from nano- to macroscale
- progressive damage analysis
- process health management
- experimental model verification

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
General interest in space and space research
Ability to gather and share relevant information

Behavioural competencies

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

Education

You should have recently completed, or be close to completion of a PhD in Materials science or equivalent.
Preference will be given to candidates awarded their doctorate within past five years.

Additional requirements

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 26 May 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.

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 Slovenia, as an Associate Member, or Canada as a Cooperating State, can apply as well as those from Bulgaria, Cyprus, Latvia, 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