

# Job Title: Internal Research Fellow (PostDoc) in Propagation and Interaction through/with Natural Media

Req ID 2261 - Posted 20/09/2017



## 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 Propagation and Interaction through/with Natural Media

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

### Location

ESTEC, Noordwijk, The Netherlands

### Description

The Radio Frequency Payloads & Technology Division is responsible for radio frequency (RF) payloads, instruments and technologies for space and ground applications, including all equipment having a RF space/ground interface, and has a number of laboratories associated to it. The Division supports the definition, specification and development/procurement of laboratories either for ESA projects and technology programmes or external customers.

Within the RF Payloads & Technology Division, the Wave Interaction and Propagation Section focuses on the analysis of the interaction of electromagnetic waves with natural environment. This is a critical subject aiming at assessing the impact of atmosphere on the performance of space communication links or on the accuracy of satellite navigation solutions. It is also a key component in the generation of scientific or operational products from remote sensing instruments (for Earth observation or planetary science). This field covers the development of electromagnetic interaction models (from microwaves to optical wavelengths) with natural media (atmosphere, ionosphere, vegetation, water surfaces, etc.) and their use to support system design, performance assessment (e.g. link budget, image quality) and the development of retrieval algorithms for remote sensing. The field also covers validation activities based on experimentally acquired datasets. The Section works in close collaboration with other areas in the Agency.

Interested candidates are encouraged to visit the ESA website.

### Field(s) of activities/research

Within the field of optical interactions with natural media, two axes of research are proposed:

## 1. Interaction analysis in support to hyperspectral and thermal infrared observations

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Future ESA Earth observation missions will most likely produce medium- to high-resolution optical hyper-spectral and thermal infrared observations. In order to prepare for these future developments, there is a need to:

- Develop, verify and apply methods to assess the quality of simulated reflectance/temperature signatures (e.g. statistic/stochastic methods, data analysis, fuzzy logic methods, etc.)
- Enrich existing databases with simulations using state-of-the-art surface reflectance/temperature simulation tools e.g. extending the variability of vegetation parameters, improve 3D modeling. Additional scenarios could also be added.
- Assess the implementation of retrieval approaches using available signature databases and tools.

## 2. Optical propagation through the atmosphere

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The propagation of active optical signals through the atmosphere has been extensively investigated in support to several Earth observation mission concepts and has resulted in the setting-up of experiments and the development of tools and databases.

As optical propagation is now being considered for ground to space data transmission links through the atmosphere there is a strong interest in reusing and adapting the knowledge and tools acquired by the Earth observation community. The subject of this work is to review the state of the art of optical propagation and interaction in the atmosphere and to expand and adapt them for future SatCom applications.

### **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 a relevant physics or electrical engineering domain. Preference will be given to applications submitted by candidates within five years of receiving their PhD. A solid mathematical background is required, as well as programming skills. Knowledge of Python and of bash programming in a Linux environment is an asset.

### **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.  
Applicants should have good analytical and communication skills and should be able to work in a multi-cultural environment in an autonomous manner.

### **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. Candidates must also arrange for three letters of reference to be sent by e-mail, before the deadline, to [temp.htr@esa.int](mailto:temp.htr@esa.int). The letters must be sent by the referees themselves. The candidate's name must be mentioned in the subject of the email.

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