Research Fellowship in ” Development of new terrestrial science products using innovative SAR based Earth Observation mission concepts”

Directorate of Earth Observation Programmes

ESTEC, Noordwijk, The Netherlands

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Overview of the Division’s mission

The Mission Science Division is responsible for supporting preparatory research, the development of future concepts, and implementation of satellite missions as part of ESA's Earth Observation Programme (Earth Explorer, Copernicus, and Earth Watch satellite missions), with the objective of achieving specific scientific goals in environmental and climate research. In support of this activity, the Division is responsible for definition and supervision of relevant supporting scientific studies, airborne campaigns and acts as a focal point for interactions between ESA and the Earth Observation scientific and user communities and provides necessary scientific support to all ESA Earth Explorer preparatory projects and missions approved for development (ADM-Aeolus, CryoSat, EarthCARE, GOCE, SMOS, Swarm and Biomass).

Overview of the field of research proposed

The proposed research takes place within the context of two innovative ESA Synthetic Aperture Radar (SAR) equipped scientific missions: the Biomass mission and the SAOCOM companion satellite (TangoSat) mission concept. Biomass, the 7th Explorer satellite recently approved for implementation, will be the first P-band SAR spaceborne mission (with launch in 2020). Its main objective is to provide repeated, accurate forest biomass estimates of global tropical forests supporting better estimates of the land carbon cycle. The SAOCOM-CS/TangoSat mission concept currently under assessment at ESA comprises a small companion satellite which is designed to fly in convoy with the L-band Argentinian CONAE satellite. When operated together, the two satellites provide unique, opportunities for highly innovative space borne measurements of the Earth’s surface using bistatic geometries, addressing terrestrial applications ranging from forest biomass retrieval to soil moisture mapping as well as tectonics and surface deformation.

A common element of both missions is that the radar measurements will need to be transformed into spatially explicit information products including land cover maps and geophysical parameters such as forest height, vegetation biomass, soil moisture, etc. The research proposed in the context of this Fellowship is to investigate in more detail the methods, building on previous and on-going airborne campaigns and scientific studies. Depending on the interests of the candidate, the research activities can focus within the following themes:

- Forest biomass retrievals: for both missions forest biomass retrieval algorithms have been proposed by several international research groups. However, independent investigations addressing the comparisons between these retrieval approaches and implementation issues are lacking (e.g. the need for accurate land cover maps and other ancillary data). In addition the added value of these missions with respect to single L-band SAR missions needs to be documented in more detail. Lastly the integration of complementary information from optical satellites such as for example Sentinel-2/-3, SPOT and LandSat needs to be studied in more detail.

- Analysis of ESA airborne campaign data: extensive airborne and ground data sets have been collected in support of the Biomass and SAOCOM-CS/TangoSat missions. This includes access to airborne campaign datasets collected in Indonesia, French Guiana and in the future Africa. This ESA fellowship will provide the opportunity to study these data sets to help identify promising new science data products (for example a combined L- and P-band vegetation or optical/SAR product or similar) and assess product accuracy and performance.

Who can apply

The Programme is open to suitably qualified women and men. Preference will be given to applications submitted by candidates within five years of receiving their PhD.

The Research Fellow Programme is open to nationals 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 UK, or Canada as a Cooperating State, Bulgaria, Estonia, Hungary, Latvia, Slovakia and Slovenia as European Cooperating States (ECS).

Required qualifications

Applicants must have recently completed their PhD studies in physics, geophysics, geography or in a related discipline, and should have documented experience in the quantitative analyses of satellite (optical and radar) imagery applied to the study of the Earth's surface. A background in the development and use of software tools for data analyses and image processing, as well as analytical skills in the interpretation of analyses results are considered an asset for the position.

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

Applicants must be fluent in English and/or French, the working languages of the Agency. A good proficiency in English is required.

How to Apply

Please fill in the online application form attaching to it, **in one document only,** your CV, your motivation letter and your research proposal.

Candidates must also arrange for up to **three letters of reference** to be sent by e-mail, before the deadline, to the **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.

Applications satisfying the general conditions for eligibility, to be submitted by 6 May 2015, will be evaluated and successful applicants will be invited for an interview.

Interested candidates are highly encouraged to visit the ESA website: www.esa.int.