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DLR – DAAD – Fellowships

Fellowship No. 294

Research Area : Space, Aeronautics

Research Topic: **Integrating Polarimetric, Interferometric and Tomographic SAR Information for Improving Forest Structure Estimates**

DLR Institute: Microwaves and Radar Institute (IHR), Radar Concepts Department, Oberpfaffenhofen

Position: Doctoral Fellow

Openings: 1

Job Specification: Microwaves - especially at lower frequencies – are able to penetrate into and through even dense (forest) vegetation, and interact with different structural components at different heights. As a consequence, Synthetic Aperture Radar (SAR) measurements contain information on the dielectric and structural composition of (forest) vegetation. In order to extract this information and estimate forest structure parameters from SAR data different techniques - associated to different SAR measurement configurations - have been used. SAR polarimetry for example explores the polarimetric diversity of SAR measurements and provides sensitivity to the dielectric and geometric properties of the scatterers. Polarimetric SAR Interferometry (Pol-InSAR) explores the angular diversity of SAR measurements and provides sensitivity to the vertical distribution of scatterers based on a limited number of polarimetric SAR acquisitions. Finally, Polarimetric SAR Tomography (Pol-TomoSAR) allows the reconstruction of the 3-D radar reflectivity using a large(r) number of polarimetric acquisitions spread over a wide(r) angular range. While each of these techniques for itself is well established and allows the model based estimation of forest structure parameters the link between them is today not clearly understood. This gap becomes especially critical in the context of future spaceborne SAR missions (as ESA´s BIOMASS or DLR´s Tandem-L mission) able to acquire polarimetric, interferometric and tomographic data, as it prevents a combined estimation of parameters or a combination of parameters obtained from each technique individually.

In the framework of the proposed Doctoral Thesis the inherent link between PolSAR, Pol-InSAR and Pol-TomoSAR measurements and the associated inversion models should be investigated. For each technique the established inversion models should be reviewed and compared with respect to common or equivalent parameters or elements. The development of a common inversion framework should be addressed and validated. A large number of experimental air-borne SAR data and the appropriate reference / validation data are available to support the activities.

The fellowship is with the Information Retrieval research group in the Radar Concepts Department of DLR's Microwave and Radar Institute in Oberpfaffenhofen, Weßling. The candidate will work within an international and multi-disciplinary team with leading expertise in the field of geophysical parameter inversion from multidimensional SAR data.

We are looking for a highly motivated candidate preferably with background in remote sensing, electromagnetics, signal processing and/or parameter estimation. Analytical skills and basic programming experience in IDL, Python, Matlab, or equivalent are preferable.

Required Qualification: University diploma or master in a technical / engineering or scientific discipline with emphasis on electromagnetics, physics, and/or signal processing.

Applicants should have good interpersonal and communication skills and should be able to work in an international and interdisciplinary environment, both independently and as part of a team.

Advantageous Skills: Experience in remote sensing, electromagnetics, signal processing and/or parameter estimation. Analytical skills and basic programming experience in IDL, Python, Matlab or equivalent.

English competence: The working language is English. A good speaking/writing knowledge is required.

Earliest Start Date: Instantly

Application Deadline: Until position filled

Further Information: www.dlr.de/hr/en/
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