

## Helmholtz Young Investigators Group "SiPEO" – Open PhD Position

### Hyperspectral Data Analysis

#### Description:

Hyperspectral data are characterized by very rich spectral information, which makes them apt to detecting targets of interest, but also introduce drawbacks caused by their high dimensionality. One goal of the envisioned PhD work is to develop efficient and semi-lossless data compression and recovery techniques for the upcoming EnMAP mission. Non-negative and sparse properties of the hyperspectral imagery will be exploited for data compression using the sparse non-negative matrix factorization (NMF) technique.

Almost all existing hyperspectral unmixing methods assume linear mixing models that are not valid in cases of multiple scattering involving different materials. Another goal of the envisioned PhD work is to develop nonlinear unmixing algorithms. Since there will be no generally applicable model for nonlinear unmixing, a few specific applications will be identified to study the scattering mechanisms. Nonlinear models will be learned by using modern signal processing techniques. Robust estimators that allow for errors in the spectral library will be implemented to retrieve abundance vectors of the mixed material. All developed methods will be compared to existing image fusion methods quantitatively using well-known metrics.

This position belongs to the Helmholtz Young Investigators Group "SiPEO" whose mission is to develop explorative algorithms to improve information retrieval from remote sensing data, in particular those from current and the next generation of Earth observation missions. The PhD work will be carried out jointly with the Remote Sensing Technology Institute, DLR (DLR-IMF) and the Remote Sensing Technology Department, TUM (TUM-LMF).

#### Profile:

- Master in Earth Sciences (Geophysics), Mathematics, Physics, Computer Science or equivalent
- Have or acquire during the research an in-depth knowledge of programming
- Creative and passionate

The scholarship is awarded for a three-year period, with possible extension of up to one further year. The monthly salary is based on the DAAD scholarship standard. Additional funding for conferences and publications is granted. Optional academic exchange is negotiable.

Interested candidates should submit curriculum vitae, cover letter together with academic records to the email address given below.

#### Contact person:

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