1-year Post-doctoral position (renewable) available at CEA Grenoble

“Compressed sensing methods for spectroscopic electron tomography”

Applications are invited for a Post-doctoral position funded by CEA in the context of an interdisciplinary project involving experts in: (1) electron tomography at CEA Grenoble/DRT/LETI (Zineb Saghi), (2) magnetic resonance imaging at CEA Saclay/NeuroSpin (Philippe Ciuciu) and (3) cosmology at CEA Saclay/Dap/CosmoStat (Jean-Luc Starck).

The position is for 1 year, renewable. The starting date will ideally be in January, 2019.

Research Topic:

Electron tomography (ET) is a well-established technique for the 3D morphological characterization of materials at the nanoscale. Recently, significant advances in transmission electron microscopy have allowed the extension of ET to spectroscopic modes for 3D structural and chemical analysis. Spectroscopic ET requires, however, the development of powerful tomography algorithms that are capable of producing reliable reconstructions from datasets that are often limited due to constraints about total electron dose and acquisition time.

The main goal of this project is to explore advanced sparsity-based algorithms in order to improve the resolution of spectroscopic ET and reduce significantly the dose. Novel CS-inspired methods will also be tested for dimensionality reduction and spectral un-mixing.

The code will be written in Python, using the library Hyperspy (hyperspy.org), and the PySAP toolbox (Python Sparse data Analysis Package) developed by P. Ciuciu and J-L. Starck.

State-of-the-art microscopes available at the Nanocharacterization Platform (PFNC) will be used to generate STEM-EELS and STEM-EDX tomographic datasets.

Profile:

Eligible qualifications for this position include:
- PhD in tomography or related 3D technique.
- Solid background in convex optimization and inverse problem solving.
- Proficiency in Python and C or C++. Experience with GPU programming.
- Excellent written and verbal communication skills in English.

Location & Resources:
The successful candidate will be located at CEA Grenoble, with short stays at NeuroSpin (CEA Saclay). He/she will have access to the computing facilities at CEA Grenoble and NeuroSpin.

Applications deadline:
December 15, 2018. Please send a CV, a short cover letter and contact details of three referees.

Contacts:
Zineb Saghi (zineb.saghi@cea.fr), Philippe Ciuciu (philippe.ciuciu@cea.fr), Jean-Luc Starck (jlstarck@gmail.com).