UPPA and TOTAL E&P are jointly offering a

# Post-Doctoral position "Reconstruction techniques for dual energy CT applied to sub-voxel porosity quantification" (100%)

## Project summary

This project aims at pushing the limits of lab-based dual energy CT, in view of characterizing unresolved porosities at sub-voxel resolution from CT images at the pore scale.

Dual energy CT exploits the fact that each material attenuates X-rays differently, and this attenuation is a highly non-linear function of the photon energy. Two scans, performed at different energy levels, therefore permit identifying material phases and quantifying their density. Dual energy CT was initially developed for medical applications, and has been successfully used in the petroleum sector at the core scale. Applications at the pore scale suffer from a number of problems, such as beam hardening and image noise. Furthermore, the range of atomic numbers encountered in geomaterials is much larger than in the human body.

Given these challenges, the successful application of dual energy CT at the pore scale requires a novel approach. The current project relies on the development of a novel iterative reconstruction algorithm. Inspired by the work on discrete reconstruction algorithms, the novel algorithm aims to determine ratio between bulk material and porosity in each voxel, based on two sets of projections corresponding to two distinct energy levels. Besides conceiving and implementing this novel algorithm, the project encompasses the design and realization of validation and benchmark experiments, including the design of dedicated X-ray phantoms.

## Desired profile

We are looking for a highly motivated, communicative person with interest and background in the proposed research project.

- The candidate should hold a PhD degree in physics, scientific computing, image reconstruction or another discipline which relates to the proposed project. Programming skills are a must, as well as experimental and technical skills. Prior experience with tomography and/or dual energy is a plus. Knowledge on porous media is also an asset.
- The candidate should have the ability to efficiently perform independent research. On the other hand he/she should also possess the necessary verbal and written communication skills to collaborate effectively in a team environment and to be capable of clearly explaining technical information to a non-technical audience.
- Fluency in English is required. Knowledge of French is an asset.

## Location an practical aspects

The successful applicant will be hosted by the UPPA at the Chair for X-ray imaging (http://imagingcentre.univ-pau.fr/). He/she will work under the supervision of P. Moonen (UPPA) and in close contact with the core imaging teams of Total in Pau. The position is limited to 18 months. The envisaged starting date is September 1$^{st}$ 2017 but can be altered in mutual agreement.

## Applications

Interested candidates should electronically submit their CV, motivation letter, diploma copies as well as the names and contact information of at least two references to Peter Moonen (peter.moonen@univ-pau.fr). Any other way of applying will not be considered. We consider until a suitable candidate has been found.

For further information please contact Peter Moonen (peter.moonen@univ-pau.fr).