

Postdoc position at University of Pau & Pays Adour

**Experimental and numerical study of reactive transport in porous media under deep geothermal conditions**

*Étude expérimentale et numérique des écoulements réactifs dans le milieu poreux sous des conditions de géothermie profonde*

**Keywords**

Geothermal energy, thermokinetics, thermo-hydro-chemical modeling.

**Research project**

With the growing energy needs of our contemporary society, new sources of energy and technologies must be developed. Geothermal energy is a renewable resource that has the advantage, among others, of being always available and without storage constraints.

One of the critical processes for the operation of a geothermal power plant is well scaling induced by barite ( $\text{BaSO}_4$ ) precipitation. This phenomenon drastically reduces the injectivity of the well and the long-term efficiency of the power-plant. The DEEPCHEM project conducted in the framework of a collaboration between the *Laboratoire de Thermique, Energétique et Procédés (LaTEP)* and *IFP Énergies nouvelles (IFPEN)*, supported by CARNOT ISIFoR and IFPEN, is a 1-year project that aims to improve the prediction of barite precipitation in geothermal conditions. In that prospect, the approach proposed in this project will combine laboratory experiments and reactive transport modeling.

The project will start by a bibliographic review of the available data on barite precipitation. A particular attention will be paid to the existing thermokinetic models describing the nucleation and growth of barite. In order to extend the existing data up to deep geothermal conditions (about 200°C), liquid-solid equilibrium experiments will be performed. The main part of the study will then consist in implementing one or several barite precipitation models in CooresFlow, a reactive transport code provided by IFPEN. Evaluation of the different models will be realized by comparison of numerical results with literature data. In a final stage, the most adequate model will be used in an extrapolated simulation describing scale formation in a geothermal well.

**Candidate's profile**

We are seeking a candidate with a background in engineering sciences, physics or chemistry, with prior experience in numerical scientific computing. Knowledge of crystallization theories, thermodynamics and C++ language are a plus. The candidate should have a strong interest in performing numerical simulations, complemented with experimental input generation, in a multi-disciplinary team. Applicants must be capable to communicate their research in English and French.

**Job details**

The successful candidate will be hosted by the LaTEP at the University of Pau & Pays Adour (UPPA) in Pau, France. Two 15-days-missions at IFPEN offices (Rueil-Malmaison) will be scheduled during the project. The project will be directed by Assoc. Prof. Dr. Lidia Casas and co-directed by CNRS Assoc. Scientist Dr. Hannelore Derluyn, together with two researchers from IFPEN (Audrey Estublier and Dr. Pierre Bachaud). The envisioned starting date is 1 October 2019, for a project duration of 1 year. The gross salary is 2800 € per month.

**Evaluation procedure**

Candidates are ranked in a first phase based on their submitted application. In a second phase, an interview will be organized with the selected candidates (possibly via Skype). Applications should

include a cover letter motivating the application, CV, transcript of PhD diploma, recommendation letters, and names and contact details of (at least two) references.

Applications should be submitted **before 24/06/2019** to the following email address: [lidia.casas@univ-pau.fr](mailto:lidia.casas@univ-pau.fr). The interview will take place beginning of July. For further information about this position, please contact Dr. Lidia Casas ([lidia.casas@univ-pau.fr](mailto:lidia.casas@univ-pau.fr)).