PhD position at the University of Rennes and Aix-Marseille University, France

" Dissolution trapping of CO2: convective dissolution in granular porous media"

We offer a **3-year PhD grant** in co-supervision between the Geosciences Department of the University of Rennes (Rennes, France) and IRPHÉ (Institut de Recherche sur les Phénomènes Hors Équilibre) at Aix-Marseille University (Marseille, France). The grant is funded by CNRS, the French National Center for Scientific Research.

Host institution: Department of Geosciences (GR), Univ. Rennes and Institut des Systèmes Hors Équilibre (IRPHÉ), Aix-Marseille Univ.

Supervision: Prof. Yves Méheust (GR) and Prof. Patrice Meunier (GR)

Project description:

The project addresses dissolution trapping of CO2, which is one of the four mechanisms by which CO2 can be trapped in the subsurface. Dissolution trapping occurs when supercritical CO2 injected in a deep permeable geological formation finds itself above the resident aqueous phase, and partially dissolves into that liquid. A process coupling this partial dissolution, natural convection of CO2-enriched liquid within the aqueous phase, and the mixing of dissolved CO2 in that phase, ensues. This so-called convective dissolution allows storing CO2 in dissolved form, perennially, by gravity. The PhD project aims at studying convective dissolution experimentally inside granular porous media, by using optical methods (laser-induced fluorescence and stereo-PIV) to measure the three-dimensional concentration field of dissolved CO2 and the flow velocities.

Applicant profile:

We welcome applicants with a PhD in engineering (mechanical/chemical/civil) or natural sciences (fluid mechanics, physics, earth sciences, hydrology). Good knowledge of fluid mechanics and transport processes is required. Some experience with table-top flow experiments would be a strong asset. The capacity to use Matlab or Python to treat data (in particular, images), will be appreciated. Good ability for interdisciplinary work and good organizational skills are a must.

Work conditions:

We offer a highly motivating environment within GR and IRPhÉ, and all the necessary equipment and lab space. The PhD can be based in either of the two institutes; the other institute will serve as a secondment host for one year out of the three years of PhD. The city of Rennes, capital of the Brittany region, is renown in France and Europe for its quality of life, while Marseille, located on the mediterranean coast, is the second largest city in France and was named European Capital of Culture in 2013.

The salary is the standard CNRS PhD student salary, which includes social security benefits according to the French laws. The University of Rennes and Aix-Marseille University advocate gender equality. Women are therefore strongly encouraged to apply. The work language will be either English or French, depending on the PhD student's preferred language.

Contact:

Application should be addressed electronically to Prof. Yves Méheust (yves.meheust@univ-rennes1.fr,) and Prof. Patrice Meunier (patrice.meunier@univ-amu.fr). The application should include, besides a CV and a publication list, a short statement of motivation.

Start date: As early as possible, but no later than July^{1st}, 2026.

Application deadline: March. 15th, 2026.