



## PHD Position at Laboratoire Navier/CERMES, Ecole des Ponts ParisTech, Champs-sur-Marne, France

Thesis supervised by Jean Sulem, Jean-Claude Dupla and Jean Canou

### Topic:

Water injection is commonly used in petroleum engineering for enhancing oil recovery as well as for disposing of waste water. In unconsolidated reservoir, injectivity can be reduced due to the deposition of fines transported with the injected fluid and the clogging of the formation at the vicinity of the injection well. On the other hand, hydraulic fracturing can be used to enhance oil and gas production. This method is also applied for unconsolidated reservoir such as sand beds. The goal of the project is to develop an experimental study to explore the mechanisms of hydraulic fracturing in sand reservoirs and understand the physics of high rate injection into cohesionless sand packs. A radial injection setup that mimic the conditions of injection wells has recently been developed in Navier/CERMES Laboratory. This device will be used for performing the injection tests and analyse the mechanisms of clogging and/or fracturing. The effect of various parameters such as the imposed stresses, the type of injected fluid, the permeability of the formation will be explored. Post-mortem X-ray tomography observations will be performed to characterize the fracturing modes. This project is developed in cooperation with Total SA.

Feia, S., Dupla, J. C., Ghabezloo, S., Sulem, J., Canou, J., Onaisi, A., Lescanne Herbert, Aubry, E. (2015). Experimental investigation of particle suspension injection and permeability impairment in porous media. *Geomechanics for Energy and the Environment*, 3, 24–39.

Feia, S., Dupla, J.-C., Canou, J., Ghabezloo, S., Sulem, J., Chabot, B., Aubry, E., Mainguy, M. (2017). An Experimental Setup with Radial Injection for Investigation of Transport and Deposition of Suspended Particles in Porous Media. *Geotechnical Testing Journal*, 40(6), 115-1124.

### Candidate profile:

The candidate should have a good background in soil and rock mechanics and strong motivation for experimental testing. Curiosity, and willingness to learn and to develop new ideas are essential to accomplish the project.

### Contact:

Candidates should send an application (including a CV, a cover letter describing interests and qualifications related to the PhD Thesis and two reference Professors, all compiled in a single PDF file) to [jean.sulem@enpc.fr](mailto:jean.sulem@enpc.fr).