

**CALL FOR APPLICATION
PHD STUDENT POSITION
CHEMICAL ENGINEERING – ENVIRONMENTAL ENGINEERING
DOCTORAL SCHOOL MEGEP – UNIVERSITY OF TOULOUSE
LISBP – INSA**

**FLOTATION OF VISCOSIFIED WASTEWATERS FROM OIL
INDUSTRIES – EXPERIMENTS AND MODELLING**

CONTEXT AND OBJECTIVES

Using classical extraction techniques, oil fields only produce 30% of the oil present in the reservoirs. In the objective of increasing this performance, assisted recovery techniques are under development. Among Enhanced Oil Recovery techniques (EOR), the recovery assisted by chemical reagents covers in 2013 11% of the 370 EOR projects in the world. This technique increases by 5 to 15% the oil production. However, it also produces wastewaters that are more difficult to be treated due to their contents in chemicals. Polymers, surfactants and other additives added to enhance the oil recovery return at higher concentrations than the oil itself in wastewaters. These effluents have to be treated to release clean waters in the environment, or in the objective to reuse the chemicals.

The treatment of produced water containing these additives is affected by the viscosity increase of the water phase and by the apparition of stable emulsions. Industrially observed efficiency losses of hydrocycloning and flotation separation plants reach 50% with polymers in wastewaters.

This PhD study focuses on flotation. In that case, efficiency losses could be the consequence of the decreases of particle and bubble relative velocities with the continuous phase due to its increase in viscosity. Moreover, emulsion stabilization and capture mechanisms by bubbles are certainly disturbed by polymers and/or surfactants used by the EOR techniques.

In this context, the objective of the PhD is to increase the knowledges and the modelling of flotation accounting for these additives that modify rheology and physico-chemical properties of produce waters. The aim is to improve the design methodology of flotation devices, and more generally of separation techniques trying to keep these additives in solution for their reuse.

PHD WORK CONTENT

The PhD work will combine modelling and experiments on model liquid phases for the investigation of flotation physical chemistry and mechanisms (capture and separation). The work will be essentially experimental meanwhile the modelling work will keep as a guideline the description of the global functioning of the flotation device and it will quantitatively account for the parameters put in evidence by the experimental part.

Proposed mechanisms and models will then be confronted to data on non-viscous and viscous real phase systems.

CANDIDATE PROFILE

High level candidates with a master degree have a first experience in research (in an academic laboratory or in a research & development department of an industrial company) as requested by the Doctoral School Cf. <http://www.ed-megep.fr/>

With a proved appetency for multidisciplinary works, experimental sciences and modelling, the candidates have a master level in engineering in the area of chemical engineering or fluid mechanics, or also in physical-chemistry of colloids and interfaces.

Through his formation or experiences, the candidate can demonstrate skills in one or several of the following domains:

- chemical engineering
- two-phase flows
- physical-chemistry of colloids
- rheology
- numerical simulations
- numerical fluid mechanics

He compulsory speaks and writes in english, because the work and the reports will be in English.

CONTRACT TERMS

Length: 36 months

Start of the PhD: before 2017, September; according to the availability of the candidate

Employer: SAIC INSA de Toulouse

Salary: Research Engineer level; Gross salary : ~2000€/month according to experience

RESEARCH GROUP AND SUPERVISOR

LISBP – Toulouse (<http://www.lisbp.fr/fr/index.html>)
Research group: Transfers, Interfaces, Mixing
PhD supervisor : Pr. Pascal GUIRAUD
pascal.guiraud@insa-toulouse.fr

APPLICATION STEPS

Candidate must send a single PDF file containing a Curriculum Vitae and a motivation letter in English by e-mail to Pr. Pascal GUIRAUD
pascal.guiraud@insa-toulouse.fr

Depending upon the matching of the candidate to the profile, an interview would possibly be organized and supplementary information would be requested.

Applications will continuously be examined until a candidate is chosen by a committee including industrial partners.

The recruitment process will end on the 30th of June, 2017.