

Juiz de Fora, April 1st, 2021

Call 01/2021 – Postdoctoral

Registration for one postdoctoral fellowship is open April 01-30, 2021 in the project *Mathematical and computational modeling of foam injection used in enhanced oil recovery* developed in the Laboratory of Applied Mathematics at Federal University of Juiz de Fora ([LAMAP/UFJF](http://lamap.ufjf.br)) in partnership with SHELL BRASIL PETROLEO LTDA.

The research project's main theme is on the physical-mathematical modeling of the foam flow in the porous medium taking into account the dynamics of surfactant adsorption by rock surface, ion exchange, and the impact of the surfactant adsorption and the foam generation and stability.

The research project focuses on the following topics:

1. Analytical investigation of the existence and uniqueness of solutions of partial differential equations describing the multiphase-flow propagation in porous media. Special focus is given on the resolution of the Riemann problem for this model together with solutions in the form of traveling waves.
2. Numerical methods and computational techniques using Finite Element and Finite Volume methods for the simulation of advanced oil recovery processes using foam injection in heterogeneous porous media;
3. Uncertainty quantification and sensitivity analysis of the underlying mathematical models of foam flow in porous media and calibration of model parameters to experimental data.

CANDIDATE'S REQUIREMENTS

Desired skills, experience, and candidate profile:

- I. The candidate must have a doctorate in Applied Mathematics, Mathematics, Engineering, Computational Modeling, Computer Science, or similar areas.
- II. The candidate should have experience in modeling the flow in a porous medium.
- III. The candidate should have experience in, at least, one of the above-mentioned research topics (1-3). The preference will be given to candidates with a more interdisciplinary background.
- IV. The candidate should have advanced knowledge of English.

SCHOLARSHIP & DETAILS

The selected candidates will receive a monthly scholarship of R\$7.373,10 starting immediately after the selection. The contract is valid until November 2022 with a possible renewal.

Successful candidates will join [LAMAP](#) and work full time in the project's theme in research topics (1-3).

REGISTRATIONS

The applicant must send the following documents by email until **April 30th, 2021**:

- i) Curriculum Vitae (CV) updated. Preferably Curriculum Lattes; foreign candidates can present the curriculum in free format in English;
- ii) Cover letter (up to three pages) with candidate's motivation to join this project and identification of interest and experience in projects research topics (1-3);
- iii) A copy of 03 (three) of your main publications;
- iv) Brazilians: a copy of Identity Card; Foreigners: a copy of valid passport.
- v) A copy of Ph.D. degree or documents proving the completion of the doctorate course.

The documents must be sent by e-mail to Prof. Grigori Chapiro (Email: grigori@ice.ufjf.br) with the subject "FOAM project".

STAGES OF SELECTION AND JUDGMENT

Stage 1: The first stage of the selection will consist of the analysis of the documents listed in the REGISTRATION section. The selection will take into account the affinity with the theme and analysis of the cover letter. The result will be announced via e-mail.

Stage 2: The candidates selected in Stage 1 should participate in an interview (by web conference, in Portuguese or English), at times scheduled by the examining board. The result will be announced via email.

We expect to finish this selection before May 14, 2021.

Prof. Grigori Chapiro