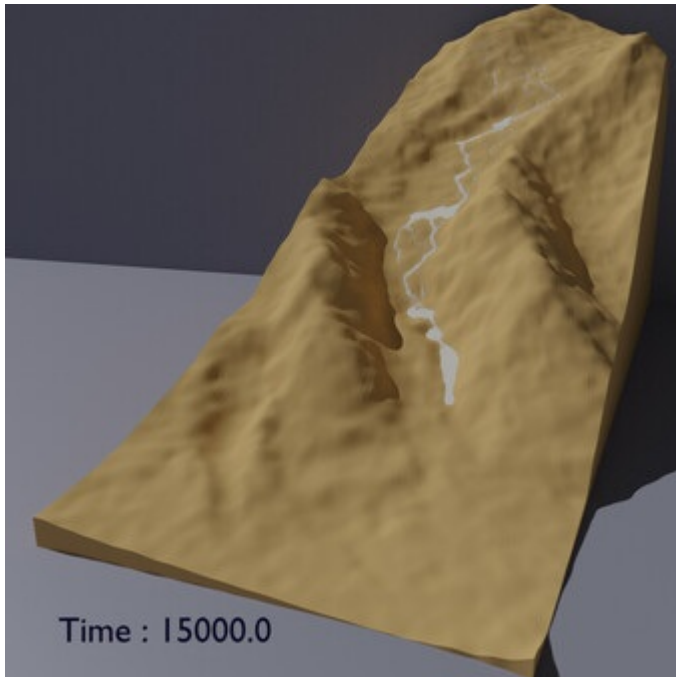


## M2 Internship Proposal - ENS de Lyon



Mentoring: Paul Vigneaux, Ass. Prof. HDR. UMPA

Title: HPC for the simulation of yield stress fluids

Time: Starts February 1st 2022 (or March 1st), duration: 6 months

In more details :

Viscoplastic fluids, or yield stress fluids, are involved in many geophysical and industrial applications. They are materials that can behave either as solids or as fluids depending on the local constraints. Because of the coexistence of fluid and solid zones whose limits are a priori unknown, simulating these flows on real applications remains a modelling challenge.

Among the algorithms for rigorous resolution of this type of models, we count the duality methods like the Augmented Lagrangian or Proximal methods. The objective of this project is to implement such algorithms in a parallel version for heterogeneous architectures. The associated simulations will be compared to the most recent physical experiments.

The internship will be carried out within an interdisciplinary team of the VPFlows ANR project, which is interested in the simulation of viscoplastic fluids for avalanche-type flows in geophysics. The recruited person will work at the ENS of Lyon, in the Unit of Pure and Applied Mathematics (UMPA CNRS UMR 5669).

Keywords: parallel computing, HPC. Fluid mechanics, CFD. French ANR project

Gratification of M2 internship: ~ 590 € / month

Profile: For M2 students with an interest in HPC computing (C++, Fortran, MPI, etc.) in connection with simulations compared to real experiments in fluid mechanics. Possibility to continue with a PhD thesis thanks to an ANR project.

For more information, do not hesitate to contact us: [paul.vigneaux@ens-lyon.fr](mailto:paul.vigneaux@ens-lyon.fr)

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