MASTER 2 INTERNSHIP (with potential PhD)
Numerical modeling of multiphase turbulent flows on complex boundaries

Scientific domain : Fluid mechanics: theory and numerics

Keywords : Numerical modeling of turbulence, Basilisk code,

Candidate skills : theoretical and numerical fluid mechanics and turbulence

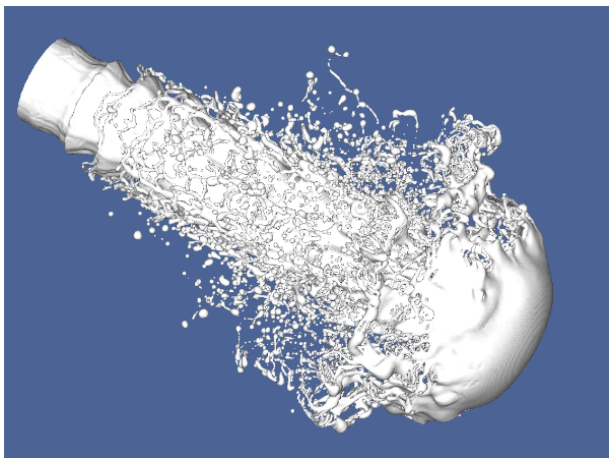
Location: LadHyX, UMR7646 CNRS & Ecole Polytechnique, Institut Polytechnique de Paris; Institut D'Alembert, UMR 7190 CNRS & Sorbonne University

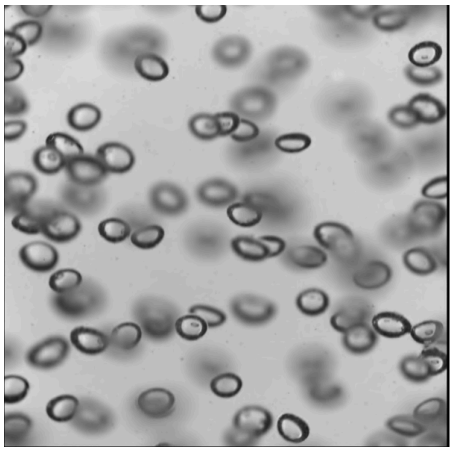
Starting date : when the M2 internships start

Contact :Christophe Josserand, christophe.josserand@polytechnique.edu ; Stéphane Popinet stephane.popinet@upmc.fr

Subject :

The modeling of turbulence in multiphase flows remains a challenge both for theory and numerical methods. The difficulty lies in particular in the mixing of length scales that the fluid interfaces bring to the problem. This is even worse when complex boundaries are involved in the flow. The aim of this internship is thus to study numerically turbulent flow in presence of complex boundaries. The code Basilisk (http://basilisk.fr) will be used to validate and develop numerical modeling with complex boundaries first for single phase fluids. Classical geometries (step, cylinder) will be first used in order to compare with existing models and experiments. Depending on the time available, simple multi-phase flows turbulent models will be also investigated.
This internship is meant as a preliminary study for a PhD thesis in collaboration with Ariane Group, where theoretical and numerical modeling of multiphase turbulent flows will be investigated.





Credits: S. Zaleski, Institut D'Alembert; R. Zenit, Brown University