Systematic numerical simulations will be performed to support model developments and validation. The intricate role of multilayer bed morphology is still ongoing due to the development of modelling approaches for remobilization in complex beds. As mentioned in a recent review, the extension of state-of-the-art numerical tools, perform simulations, analyze and validate results of multilayer beds by accounting for the bed morphology as well as inter-particle interactions. As mentioned in the doctoral student’s work, particles (i.e. smaller than a few $\mu$m). The doctoral student will participate to the development of approaches for remobilization in turbulent flows.

**Main objectives and activities**

The aim of this doctoral research is to develop a new model for the re-mobilization of particles. For that purpose, the student will extend a recent approach that has been developed for small colloidal particles (i.e. smaller than a few $\mu$m). The doctoral student will participate to the development of state-of-the-art numerical tools, perform simulations, analyze and validate results.

As a starting point one will consider the resolved remobilization model, brought to fruition by C. Henry, that already predicted accurately the remobilization rate of sub-millimeter particles in turbulent flows [5, 6]. Extension of the model may address situation of neutrally buoyant particles in the millimeter range. Extension may also account the situation of remobilisation in multilayer beds by accounting for the bed morphology as well as inter-particle interactions. As mentioned in a recent review, the development of modelling approaches for remobilization in complex beds is still ongoing due to the intricate role of multilayer bed morphology. Systematic numerical simulations will be performed to support model developments and validation.
References


Compétences

- Candidates should have a solid background in one or more of the following topics: physics, applied mathematics, or mechanical engineering
- Strong competence and taste for code development. In particular knowledge of python/ C / C++ programming languages;
- Fluent in English

Optional competences

- Knowledge in fluid dynamics
- Knowledge in statistical physics
- Rigorous, autonomous and creative thinking
- Interest in environmental applications
- HPC skills will be appreciated

Avantages

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Rémunération

Duration: 36 months
Location: Sophia Antipolis, France
Gross Salary per month: 1982€ brut per month (year 1 & 2) and 2085€ brut/month (year 3)