

Introductory Seminar

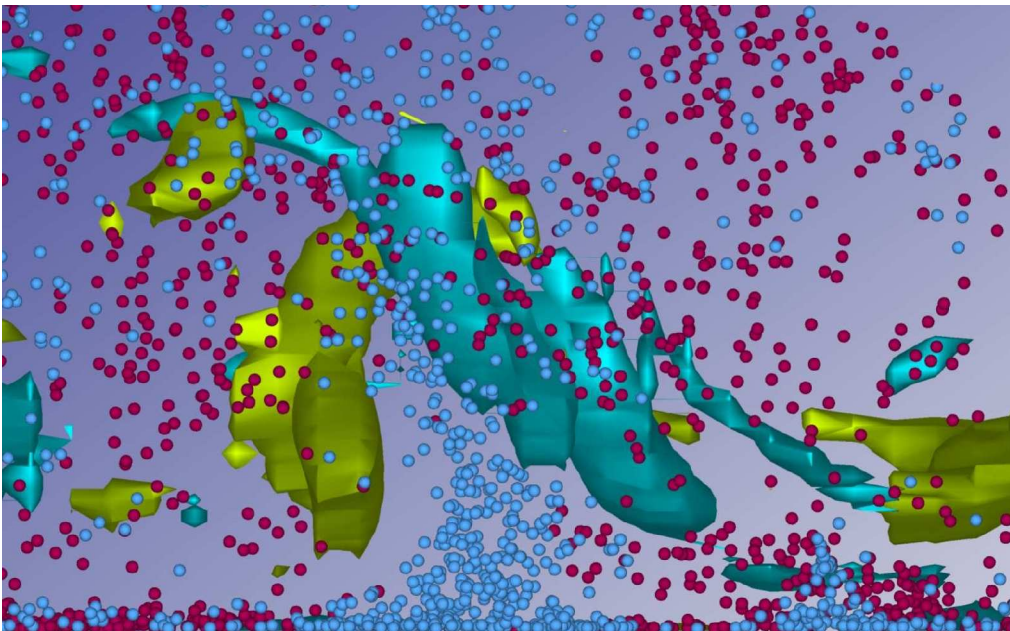
Particles, Vortices, Coherent Structures and Turbulence: Physics, computations and a little literary review

Lecturer: Professor Alfredo Soldati, University of Udine, Italy (<http://158.110.32.35/alfredo.html>)

The behavior of inertial particles entrained in turbulent flows is dominated by the particle response to the local fluid forces. Essentially, an inertial particle may be represented as a low-pass filter for high frequency turbulence fluctuations with a response fully determined by the complex pattern of coherent fluid motions. This response, induces a preferential distribution of particles which is a relevant feature determining the outcome of environmental or industrial processes. Specifically, in turbulent boundary layers, particle preferential distribution may influence settling, deposition and entrainment rates being associated with local high straining regions.

In this talk, we will briefly overview the perception of this physical phenomenon through the literary history. Then after a brief background of particle interactions with a vortex, theoretical and experimental evidence is reviewed which shows that fluid motions in turbulent boundary layers are intermittent and have a strongly organized and coherent nature represented by the large scale motions. These motions, even though not exactly repeatable and only quasi-deterministic, control the transport of the dispersed species in such a way that the overall distribution will resemble not at all those given by methods in which these motions are ignored. Local and global indicators of the flow properties influencing particle preferential distribution will also be addressed in connection with different criteria to measure particle preferential accumulation/segregation. Current work on open issues in emerging areas such as heat transfer enhancement will also be addressed.

The seminar will take place **Wednesday Ma: 7 at 14 pm in Room.....**



Particle and coherent structures interacting in a boundary layer