# Experimental PhD - Training position
# Settling of aerosol in turbulent flows

**Location :** IMSIA (ENSTA, EDF, CEA, CNRS), Institut Polytechnique de Paris, France
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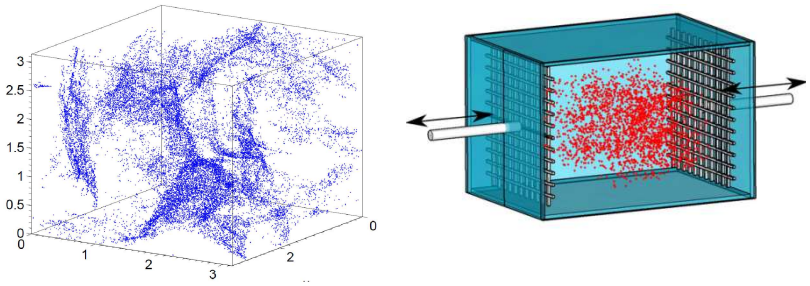
**Website: https://perso.ensta-paristech.fr/~monchaux/inert_part.html**

## Context

Settling of inertial particles is strongly affected by turbulent flows that usually increase the settling rate of particles even if in extreme cases a reduction can be observed. Along with clustering and preferential concentration, this is one of the challenging issues in our understanding of particle laden turbulent flows. Recent numerical simulations (Monchaux 2017) and experiments (Huck 2018) have strengthened the conviction based on pioneering experimental data (Aliseda 2002) that collective effects linked to fluid-particle interactions are responsible for the settling enhancement. Actual models limited to point particle approximations nevertheless fail to capture the exact dynamics that is controlled by at least four dimensionless parameters linked to particle diameter, fluid to particle density ratio and gravity and turbulence intensity.

## Project

The present project funded by DGA aims at producing a large set of experimental data enabling to disentangle the role of the different control parameters. We have chosen to work with a closed flow where turbulence is produced by two vibrated facing grids. The challenging issue of this project is to perform simultaneous measurements of both fluid and particles velocities by interfacing Particle Image Velocimetry and Particle Tracking Velocimetry systems. It also involves collaborations with Anne Dejoan in Madrid who is running numerical simulations.




*left : clustering particle in a simulation, right: the double grid experiment at IMSIA*

## Profile

Applicants should have strong background in non-linear physics and/or in fluid dynamics. She/he should have obtained a Master in physics, preferentially in the field of fluid mechanics, turbulence or dispersed phases.

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