Aerodynamisches Institut und Lehrstuhl für Strömungslehre | RWTH AACHEN UNIVERSITY

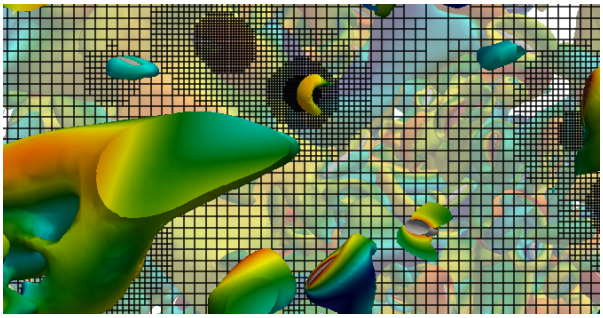
Bachelor/Master Thesis

Numerical analysis of turbulent particle-laden flows

Turbulent particle-laden flows play a crucial role in many technical applications, e.g. solid-fuel combustion. For instance, in order to accurately conduct Large-eddy simulations (LES) of a biomass fuel burner, appropriate Lagrangian point particle models for non-spherical biomass particles are required. Precise models are necessary to properly determine particle dynamics, particle temperature, as well as the heat exchange between particle and fluid.

Despite, their relevance, existing models are often limited to simplified cases or lack validation. The development and validation of such models are therefore part of a current research project at the Institute of Aerodynamics. For this, highly resolved reference data are required which are obtained by conducting large-scale direct-particle fluid simulations (DPFS). The DPFS are based on an efficient cut-cell method which is part of the in-house developed multi-physics simulation framework m-AIA. While in the past the focus was on decaying isotropic turbulence, the current focus is on more technical turbulent flows such as the simulation and analysis of particle-laden pipes and free jets for various particle shapes.

If you are interested in the field of particle-laden flows, please let us know and we will come up with a topic that fits your interests and our needs.



Highly resolved direct-particle fluid simulation of non-spherical biomass particles.

You ...

- ... are interested in computational fluid dynamics and particle-laden flows.
- ... are motivated to learn new skills and are able to work in an independent manner.
- ... have some programming experience (preferably in C++).

If you are interested, please contact:

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