The **Research Center for Pharmaceutical Engineering (RCPE)** is a global leader in pharmaceutical engineering sciences. We help our partners to create and manufacture advanced medicines for patients around the world, through optimizing products and processes.

WE ARE OFFERING A

PAID DIPLOMA/ MASTER'S THESIS

SIMULATION OF PARTICLE-FLUID INTERACTION USING AN IMMERSED BOUNDARY METHOD: A VALIDATION STUDY (GRANSYS-CG PROJECT)

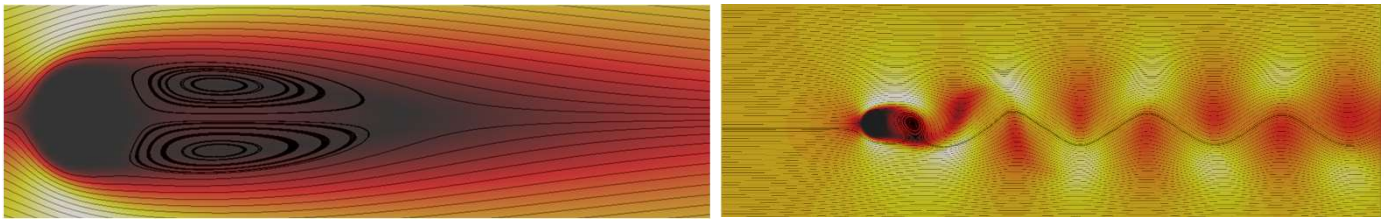
REF. NO. DA151

To dedicated students of Chemical, or mechanical, Civil Engineering, Physics or related disciplines, we offer an opportunity to write a paid Diploma/Master's thesis. The project is conducted in close cooperation with the Institute of Process and Particle Engineering, TU Graz.

OBJECTIVE:

Granular matter is extensively used in various industrial sectors. However, control and optimization of granulation systems pose significant challenges. This is since the mechanism of agglomeration and de-agglomeration is not well-understood. Therefore, in the GranSys-CG project, we focus on the **fundamental investigation of wet particles interaction using multi-scale simulation approaches**. For this purpose, we developed an **Immersed Boundary Method** (IBM) Solver in the OpenFOAM platform to simulate the particles' motion and interaction.

In the framework of this project, we are hiring two Master's students to i) **test and validate our solver** for various cases (see the figure below as an example), ii) conduct a **literature review on the IBM** approaches and compare our code with the publicly available OpenFOAM solver to evaluate the accuracy, stability and speed of different solvers.



Flow past a cylinder for $N_{Re} = 40$ (left panel) and $N_{Re} = 100$ (right panel)

QUALIFICATIONS:

- Strong interest in fluid mechanics, multiphase flow, computational fluid dynamic (CFD)
- First experience in programming with MATLAB®, as well as interest to expand your programming knowledge
- First experience in mathematical modelling and numerical simulation (e.g., with MATLAB®). First experience with the software OpenFOAM® is preferable, but not required.

WITHIN THE FRAMEWORK OF THIS DIPLOMA/ MASTER'S THESIS WE OFFER THE FOLLOWING:

- Extensive participation in a top-level and industrially relevant research project in an international environment
- Supervised training in the task to acquire experience in CFD simulation of multiphase flow
- Assistance with the publication of results and presenting at the conferences
- Perspective for future collaboration depending on the progress and qualification
- Adequate compensation and opportunities for personal and professional development

FINANCING:

- Compensation on the basis of a service contract

IF YOU ARE INTERESTED IN WRITING YOUR THESIS AT THE INTERFACE BETWEEN UNIVERSITY RESEARCH AND INDUSTRY/ BUSINESS AND TO CONTRIBUTE TO THE OPTIMIZATION OF PRODUCT AND PROCESS DEVELOPMENT IN THE PHARMACEUTICAL INDUSTRY, PLEASE CONTACT US INDICATING THE REFERENCE NUMBER.

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