

## HiWi position

for students of Mechanical Engineering, CES, SiSc, etc.

### Complex Fluids Simulations using Advanced Meshing Techniques

In the field of Computational Fluid Dynamics (CFD), meshing techniques can play a major role in terms of accuracy and computational efficiency. Techniques such as adaptive space or time refinement allow us to obtain high-resolution results in specific areas of interest while maintaining a coarse resolution in the rest of the domain. Within the application of injection molding simulations, we are exploring new advanced meshing techniques. Using space-time meshes we want to achieve time refinement in a moving localized area, which will permit us to noticeably reduce the computational time while keeping high-resolution results.

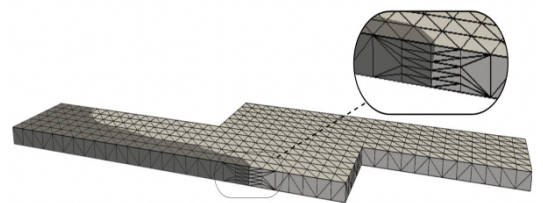


Fig.1: Space-time mesh with time refinement.

For the injection molding simulations, we use an in-house multiphysics finite-element solver called XNS.

The project is part of the program SFB1120 "Precision Melt Engineering" funded by the German Research Foundation (DFG).

#### What we offer

You will learn in-depth the complexities of state-of-the-art meshing techniques, as well as the structure and function of advanced finite-element for fluids software like XNS.

Your tasks will consist of:

- Running 3D complex fluid simulations with adaptive time-refinement
- Learning the XNS development workflow
- Manipulating pre- and post-processing tools, like meshing and visualization software

#### Prerequisites

- Programming skills
- Familiarity with the finite element method (FEM)
- Interest in CFD

Contact: Blanca Ferrer Fabón, Schinkelstraße 2, Room 222a  
E-Mail: [ferrer@cats.rwth-aachen.de](mailto:ferrer@cats.rwth-aachen.de) • Tel.: +49 241 80-99931