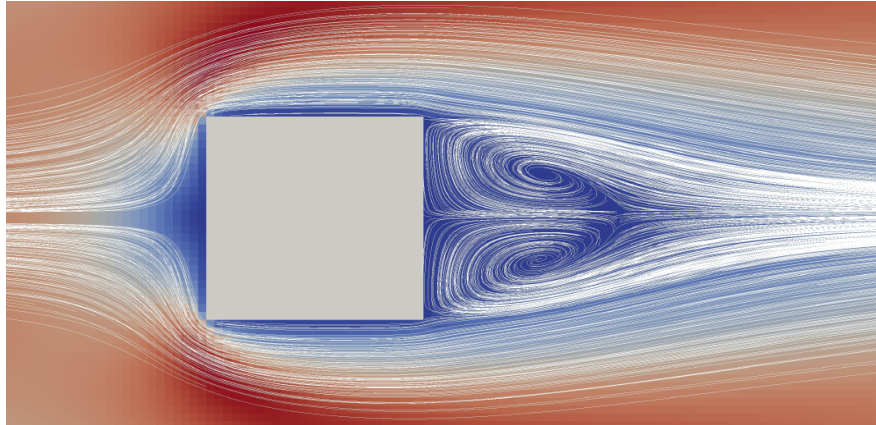


*Compact Course*

# Computational Fluid Dynamics with the Lattice Boltzmann Method

Florian Schornbaum, Simon Bogner

at KTH Stockholm, March 17-21, 2014



The topic of this course is an introduction of the lattice Boltzmann method (LBM) for simulating hydrodynamic problems in complex geometries. The lattice Boltzmann method is an alternative to classical Navier-Stokes solvers for computational fluid dynamics (CFD) simulations. For 3D LBM simulations, the simulation domain is typically discretized into a uniform Cartesian grid. LBM uses an explicit time stepping scheme that is well suited for extensive parallelization due to its high locality.

The course consists of a lecture part held in the morning and practical exercises in the afternoon. For the exercise classes, the parallel LBM framework waLBerla will be used. WaLBerla is a massively parallel framework written in C++. During the course, an introduction to parallel programming with C++ will be given. The framework already provides all the functionality that is required for setting up a working fluid simulator. Your task will be to re-implement a simple lattice Boltzmann algorithm based on the theory presented in the lecture.

- When:** March 17 - 21, 2014, full days  
**Where:** KTH Stockholm  
**Who:** Florian Schornbaum, Simon Bogner,  
University of Erlangen-Nuremberg, Department of Computer Science  
**How:** 4 hours of lectures in the morning  
4 hours of computer lab during the afternoon  
**Course code:** 2 ECTS (scientific)  
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