Seminar im Rahmen des GRK 2078

Referee:	**Prof. Dr.-Ing. Sabine Roller** Simulation Techniques and Scientific Computing, University of Siegen, Germany
Date:	Tuesday, 11. December 2018
Time:	14:00 h
Location:	Bldg. 10.23, 3rd Floor, Room 308.1 (KM-Seminar Room)
Title:	**Continuous and Discontinuous Galerkin methods in fluid dynamics and fluid-structure interaction**

Abstract

Interaction between structures and the flow around them requires a correct treatment of both of them. If the computational requirements are high, the methods need to be efficient on modern supercomputers that offer a high number of compute nodes and cores. In structural mechanics, often Fininte Element (FE) methods are used, while fluid dynamics (especially for compressible flows) often apply Finite Volume (FV) methods. The best of two worlds is obtained with Discontinuous Galerkin (DG) methods, which are highly appropriate in regions with discontinuous solutions, but also highly accurate in regions with smooth solutions. The variation of h and p (mesh size and order of the polynomial) gives additional freedom to adopt to modern supercomputers. Nevertheless, thinking of the next generation of HPC, even with small h and high p, the number of degrees of freedom (DoF) is low compared to the number of compute cores of the system. To allow efficient usage of those extremely large systems, even parallelization in time is necessary. At this point, Continuous Galerkin (CG) methods come back into play again. This presentation will introduce into the interplay of application and numerical method on the one side (quality of the solution), the interplay of numerical method and suitability for highly scalable compute systems (co-design), and show some examples of flow around moving geometries (represented as an immersed boundary).

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Alle Interessenten sind herzlich eingeladen.
Prof. Dr.-Ing. Thomas Böhlke