ChE SEMINAR

Combining Granular Dynamics and Lattice Boltzmann Methods

Prof. Dr. Ulrich Ruede
Chair for System Simulation
Department of Computer Science 10
University of Erlangen-Nuremberg
D 91058, Erlangen, Germany.
https://www10.informatik.uni-erlangen.de/

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ABSTRACT

In this talk we will present two simulation tools developed at the Chair for simulation at FAU Erlangen. The first is the PE software for granular systems based on rigid body dynamics. The second one is a software-framework that is code-named waLBerla and that is centered around the Lattice Boltzmann method for computational fluid dynamics. The talk will present applications where the two tools are combined to simulate flow in porous media with a full geometric resolution of the pore scale. Additionally, a four-way-coupling between moving particles with the hydrodynamics has been implemented so that a fully resolved, direct numerical simulation of particle ladden flows becomes possible. Both frameworks are parallelized and can be used on large supercomputers to reach unprecedented resolution in simulating complex flows.

Speaker

Prof. Ruede is the Chair for System Simulation at the Department of Computer Science of University of Erlangen-Nuremberg in Erlangen in Germany. He and his research group are working on simulation methods for physical, continuous systems and their implementation on modern non-standard architectures and high performance computers, multilevel methods and simulations of lasers and solar cells. He has served as editor-in-chief for the SIAM J. Scientific Computing (2005 – 2011), is a member of

the editorial boards of International Journal of Parallel and Emergent Distributed Systems, International Journal of Computational Science and Engineering (IJCSE), and of the newly published Elsevier Science Journal on Computational Science (JoCS). Since January 2011, he is chairing the Zentralinstitut für Scientific Computing, and since January 2012, he is the director of the Indo-German Winter Academy. He is serving on several German, European and international program committees. He has a large number of international publications/conference presentations to his credit (see https://www10.informatik.uni-erlangen.de/~ruede/ for further details).