Simulation of Multiphysics Multiscale Systems

http://www.science.uva.nl/~valeria/multiphysics2005/

Second International Workshop
in conjunction with the International Conference on Computational Science

May 22-25, 2005
Atlanta, USA

Introduction

Simulation of multiphysics and multiscale (MPMS) systems poses a grand challenge to computational science. A great number of real-life systems, important for industrial applications and academic research, involve interactions amongst a **range of physical phenomena** (e.g. viscous, turbulent, thermal, chemical, mechanical, electromagnetic or plasma processes). In some systems the **time and length scales** of processes studied differ by orders of magnitude. Numerical simulation of these multiphysics and multiscale problems requires the development of sophisticated models and methods for their integration, as well as efficient numerical algorithms and advanced computational techniques.

Because of the heavy computational demands of such simulations, one needs successful utilization of high-performance computing systems, which inspires progress in algorithms and methodology of parallel distributed computing. The complexity of modeling and data description, the large number and wide range of parameters under investigation, as well as the necessity to control and steer the simulation processes, motivate the development of problem solving environments, user interfaces and code integration methods.

This workshop, being a follow-up of a highly successful event held at ICCS-2004 in Krakow, Poland, aims to bring together computational physicists, numerical specialists and computational scientists to push forward this challenging multidisciplinary research field.

Topics

Specific topics include (but are not limited to):

- Modeling of multiphysics and/or multiscale systems. Of particular interest are: Monte Carlo methods, particle-based methods, mesoscopic models such as cellular-automata, lattice gas and lattice-Boltzmann methods, computational fluid dynamics and computational solid mechanics;
- Novel approaches to combine different models and scales in one problem solution;
- Large-scale industrial and academical applications (e.g. time-dependent, 3D systems, multiphase flows, fluid-structure interactions, chemical engineering, plasma physics, material science, bio-physics, automotive industry, etc.);
- Advanced numerical methods for solving multiphysics multiscale problems;
- New algorithms for parallel distributed computing, specific to the field;
- Problem solving environments for interactive simulation of MPMS problems;
- Performance analysis of MPMS simulation;
- Special hardware for MPMS simulation (e.g. Field Programmable Gate Arrays)
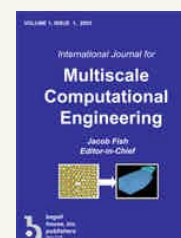
Papers

We cordially invite you to submit a paper presenting the results of original research or innovative practical application in the area of modeling and simulation of multiphysics and multiscale systems.

Papers not exceeding **8 pages**, written in English and complying with the Springer-Verlag format www.springer.de/comp/lncs /authors.html, should be submitted in **pdf** file format, electronically to the e-mail address: multiphysics-ws-iccs@science.uva.nl. **Please do not upload your workshop papers to the general ICCS submission engine!**

All papers will be peer reviewed. Accepted papers will be published by *Springer-Verlag* in the conference proceedings in *Lecture Notes in Computer Science* series. The proceedings will be available at the conference. At least one author of an accepted paper must register and present the paper at the workshop.

A selected number of papers will also be published in the special issue of the *International Journal for Multiscale Computational Engineering* after the conference.

Important dates

Short abstract* (1 page):	**December 10, 2004**	**|** * to be sent to multiphysics-ws-iccs@science.uva.nl
Full paper submission:	January 1, 2005	
Notification of acceptance:	February 14, 2005	
Camera-ready papers:	February 28, 2005	

Other information

For information on conference venue and accommodation, registration and fee, etc. please refer to the conference site http://www.mathcs.emory.edu/iccs2005

Workshop Organizers

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