Call for Papers for a Special Section on “Simulation Software for Supercomputers” in the Journal of Computational Science

Guest editors: Michael Bader, Miriam Mehl, Ulrich Rüde, Gerhard Wellein

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Scientific Computing, and the Computational Sciences, in general, have emerged into a new discipline, which is driven by a multitude of demands that stem from applied mathematics, from the respective application fields in science and engineering, and also from high performance computing. Application scenarios have shifted from individual simulation runs to parameter studies and optimisation processes, from models of limited complexity to multiphysics problems, and from comparably simple parallel clusters to hierarchically organised HPC platforms that offer parallelism on all scales.

As a result, simulation software, in particular on supercomputers, faces a multitude of new and oftentimes conflicting challenges. As models grow in complexity, simulation software itself is growing in extent and complexity. The scenario of a single-purpose code, that can be implemented within the time frame of a single PhD project, is replaced by that of generic, more versatile, interacting frameworks that are developed as group efforts. Systematic software engineering, rigorous testing and verification, and more formal approaches to developing software, in general, have therefore gained importance in the scientific computing community. Recent trends in hardware development, such as the trend to multi- and manycore CPUs have added to this scenario, as modern HPC software has to consider efficient access to memory and communication resources in order to ensure acceptable performance. Finally, the increasing parallelism on all scales, including the use of special-purpose hardware (graphical processing units, accelerator processors) need to be tackled by HPC software.

We therefore ask for articles on novel contributions and approaches to this field for a special section on Simulation Software for Supercomputers in the Journal of Computational Science (JoCS). Examples for topics include (but are not limited to):

- Software Engineering approaches for simulation software
- Improving correctness and reliability of numerical software
- Efficiency-oriented development of simulation software
- Scalability issues for HPC software
- Development of simulation software for modern and emerging hardware (multi-/manycore, GPGPU, accelerator processors, etc.)
- Tools and environments to support software development and optimisation
Contributions to the special section "Simulation Software for Supercomputers" should be submitted to JoCS according to the JoCS guidelines, available from http://ees.elsevier.com/jocs/. In particular, please refer to JoCS’ instructions for authors, regarding format and submission of papers, and make sure to select "Special Issue: Simulation Software” when asked for the “Article Type” during the online submission process. Please note that papers longer than 15 pages cannot be accepted for the special section.

All contributed papers will undergo a strict review process, in the same way as all regular submissions to JoCS. Papers will be accepted for the special section based on quality and topical relevance. For submission and reviewing, the following schedule is planned:

- Deadline for submission: March 15, 2010
- JoCS review: April-June, 2010
- Camera-ready versions: August, 2010

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