

CALL FOR PAPERS – Special issue of Sustainable Computing: Informatics and Systems (SUSCOM) on Green High Performance Computing (Green HPC)

Scope: The growing scale of High Performance Computing systems and data centers has made issues related to power consumption, air conditioning, and cooling infrastructures critical concerns in terms of efficiency, operational cost, reliability, energy conservation, and environmental impact. High-end HPC systems today consume several megawatts of power, enough to power small towns, and are in fact, soon approaching the limits of the power available to them. Furthermore, the costs of powering these HPC systems runs into millions of dollars per year, and is only increasing as these systems target sustained Petascale and plan for Exascale. Adding to the concerns due to power and cooling requirements and associated costs, empirical data show that every 10 degree Celcius increase in temperature results in a doubling of the system failure rate, which reduces the reliability of these expensive systems. At the same time, the increasing proliferation of virtualization technologies and the consolidation of computing platforms for data- and compute-intensive applications are providing new opportunities for higher utilization and energy savings. As a result, energy efficiency and the tradeoffs between energy efficiency and performance, throughput and other QoS requirements, have become important research challenges that must be addressed.

In this special issue, we seek original work focused on addressing new research and development challenges, developing new techniques and advanced information technology solutions in green computing for HPC systems, middleware technologies, application formulations, programming systems, abstractions and language extensions and runtime support.

Specific topics include, but not limited to, the following:

- Energy-aware algorithms and application formulations
 - Energy-aware HPC applications
 - Energy-efficient application design
 - Algorithms for reduced power, energy and heat
- Energy-aware language abstractions, programming systems
 - Code profiling and transformation for energy efficiency
 - Programming models extensions for energy efficiency
- Energy-aware runtime and middleware
 - Runtime systems for HPC that assist in power saving
 - Power-aware middleware for HPC
 - Energy-efficient scheduling and resource allocation
 - Energy-efficient grid, cloud, and data center technology
- Energy-aware virtualization
 - Energy efficiency and virtualization
 - Energy, performance, quality of service and other resource tradeoffs
- Energy-efficient architectures
 - Energy saving architectures
 - Power-aware architectures for HPC
 - Future energy-efficient architectures
 - System-level optimization, cross-layer coordination

Submission Details:

General information for submitting papers to SUSCOM can be found at <http://ees.elsevier.com/suscom/> (please note the "Guide for Authors" link). Submissions to this Special Issue (SI) should be made using Elsevier's editorial system at the journal website (<http://ees.elsevier.com/suscom/>, under the "submit paper" link). Please make sure to select the "SI: Green HPC" option for the type of the paper during the submission process. All submissions must be original and may not be under review by another publication. All submitted papers will be peer reviewed using the normal standards of SUSCOM. By submitting a paper to this issue, the authors agree to referee one paper (if asked) within the time frame of the SI.

Important Dates:

- Manuscript due date: **April 15, 2011**
- First decision notification: **July 15, 2011**
- Revised paper Submission: Sept 1, 2011
- Second decision notification: Oct 1, 2011
- Final papers: Nov 1, 2011
- Tentative publication schedule: **Dec 1, 2011**

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