# Proceedings of the 12th International Workshop on High-Level Parallel Programming Models and Supportive Environments

## Long Beach, California USA
## March 26th, 2007

The 12th HIPS workshop is a full-day meeting held at the IPDPS 2007 focusing on high-level programming of chip multi-processors (multi-core PCs), computing clusters, and massively-parallel machines. Like its predecessors, the workshop seeks cross-fertilizing research in areas of parallel applications, language design, compilers, run-time systems, and programming tools. It provides a timely and lightweight forum for scientists and engineers to present the latest ideas, findings, and tools in these rapidly changing fields.

HIPS 2007 features two invited talks and presentations of eleven refereed papers, which were selected out of fifteen submissions. At least three reviews for each paper were made by PC members, except for one which was deemed outside the scope by the program chair. Some papers received up to five reviews. The program committee held discussions through email. The program chair wish to acknowledge the generous contribution by the PC members. All completed reviews on time. Many interrupted their vacation or travel to give detailed and constructive reviews and to participate in group discussion. Two held review sessions with their students.

For the first time, the HIPS workshop has added a session (the last session) on programming models and tools for reliable parallel and distributed systems. The session is organized by Cristian Tapus from California Institute of Technology with a separate program committee. There is a significant overlap between the interests of HIPS and those of TOPMoDRS, so we join hands as an experiment. We renamed the workshop to HIPS-TOPMoDRS (the second part stands for tools, operating systems and programming models for developing reliable systems).

The chair wishes to thank the HIPS steering committee, Rudolf Eigenmann, Michael Gerndt, Frank Mueller, Craig Rasmussen, Martin Schulz for their support and help, the workshop chair of IPDPS, Allan Sussman, for his assistance with the organization, and Xiaoming Gu for administering the workshop web site and the review process. *Special thanks go to the workshop invited speakers, Rudolf Eigenmann of Purdue and Barbara Chapman of University of Houston.*

## Summary of Accepted Papers

Naci presents the use of a number of techniques to support inter-loop-nest data locality optimization, including loop transformations and integer linear programming.

Quenette et al. study a role-based conceptual model, application hierarchical decomposition, and aspect oriented features for developing large-scale extensible scientific code, based on experience with programming real code in geophysics.

Li and Malony extend a performance modeling framework for automated performance problem detection for complex applications with composite parallel patterns. The authors analyze a large, real application.

Jamali and Liu present a quality of service (QoS) strategy for grids that takes into account resource ownership in determining usage. The results are presented for small scale systems.

Suh et al. describe and evaluate a two-level compiler that implements the Stream Virtual Machine programming model on a special purpose multicore experimental microprocessor (the Raw research microprocessor).

Reinhardt and Karypis describe an OpenMP implementation of an algorithm that finds, in a single large labeled undirected sparse graph, the connected sub-graphs with a given minimum number of edge-disjoint embedding. It shows good scalability on up to 30 processors.

Panuganti et al. present a MATLAB toolbox that provides an optimized implementation of PNL Global Array library for use by both library writers and MATLAB end users. They compare its performance on the NAS benchmarks to the standard C and Fortran implementations using MPI.

Patarasuk and Yuan give an bandwidth-efficient algorithm for all reduce operation. The algorithm is optimal because it has the lowest communication and it is contention free. The experimental results on three clusters and two topologies show superior performance over the machine naive library and two other existing implementations.

Gabriel and Huang present a dynamic adaptive library called the Abstract Data and Communication Library (ADCL) that permits a programmer to express communication at a high level, and then uses the run time support to choose the best communication mechanism.

Vishnu et al. describe the design of an MPI communication substrate over a 12x Infini-Band network and its evaluation using both micro- and application benchmarks. The design takes advantage of the parallel communication paths and hardware send/receive engines available on the network cards.

Grelck et al. combine data- and task-parallelism using the functional array-language SaC and the stream processing language S-Net. The approach is illustrated using a program to solve the Sudoku puzzle.

## HIPS 2007 Program Committee

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January 19, 2007

**Chen Ding**
HIPS 2007 Chair
Rochester, New York, USA

# Proceedings of the $1^{st}$ Workshop on Tools, Operating Systems, and Programming Models for Developing Reliable Systems (TOPMoDRS)

Long Beach, California USA
March 26th, 2007

The $1^{st}$ TOPMoDRS workshop is a half-day session held at the International Parallel and Distributed Processing Symposium (IPDPS 2007). The workshop focuses on tools and programming models for designing reliable systems with a special focus on distributed applications. The main goal of the workshop is to bring researchers and practitioners together in a setting where they can discuss interesting research topics, like:

- novel architectures to build reliable distributed systems,
- the design and implementation of new tools, techniques, programming languages, and compilers to increase the reliability of distributed systems,
- bug finding and debugging tools for distributed applications, and
- new developments in formal verification of distributed environments.

The TOPMoDRS 2007 session is composed of five refereed papers selected from fourteen submissions. The chair of TOPMoDRS wants to thank the members of the program committee for taking the time to contribute their reviews during the holiday season.

The set of topics covered by the papers accepted at TOPMoDRS showed a significant overlap with the interests of the High-Level Parallel Programming Models and Supportive Environments (HIPS) workshop at IPDPS. Therefore, the chair of the HIPS workshop, Professor Chen Ding from University of Rochester, kindly accepted to merge the two workshops to increase the visibility of the TOPMoDRS papers and to give the authors the opportunity to present their work to a wider audience. The TOPMoDRS papers will be presented as the last session of the HIPS-TOPMoDRS workshop.

The chair also wishes to thank Alan Sussman, the workshop chair of IPDPS, for his valuable advice and for his assistance with the organization of the workshop.

**Organizer and Program Chair**

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**Other Reviewers**

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- **Michael Le**, UCLA, USA

**Cristian Ţăpuş**
TOPMoDRS 2007 Chair
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January 22nd, 2007