

HCW 2007 is sponsored by the U.S. Office of Naval Research and by the IEEE Computer Society, through the Technical Committee on Parallel Processing (TCPP)

## **The 16th Heterogeneity in Computing Workshop (HCW 2007)**

The pervasive use of networks and the Internet has lead the number of connected computing resources to grow tremendously, thus creating opportunity and need for heterogeneous computing systems. Furthermore, heterogeneity is also present in emerging computer architectures. In this context, issues of interest to the HCW workshop include but are not limited to: parallel and distributed computing, programming paradigms and tools, resource discovery and management, task and communication scheduling, task coordination and workflow management, performance management, heterogeneous cluster computing, heterogeneous computer architecture, grid computing, peer-to-peer computing, adaptive computing, ubiquitous computing, mobile computing, fault tolerance, as well as application case studies.

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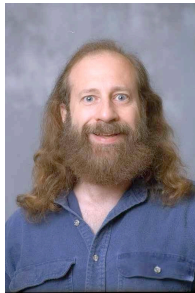
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## Message from the HCW Steering Committee Chair



These are the proceedings of the 16th Heterogeneity in Computing Workshop, also known as HCW 2007. The title of the workshop has been changed from the original title of “Heterogeneous Computing Workshop” to reflect the breadth of the impact of heterogeneity, as well as to stress that the focus of the workshop is on the management and exploitation of heterogeneity. All of this is, of course, taken in the context of the parent conference, the International Parallel and Distributed Processing Symposium (IPDPS), and so explores heterogeneity in distributed and parallel computing systems. Arnold “Army” Rosenberg, from the University of Massachusetts at Amherst, a past HCW Program Committee Chair and General Chair, suggested this name change, and it was approved by the HCW Steering Committee (listed elsewhere in these proceedings).

Heterogeneity in parallel and distributed computing systems is a very important research area with great practical impact for a large range of systems. A heterogeneous computing system may be a set of machines interconnected by a wide-area network and used to support the execution of jobs submitted by a large variety of users to process data that is distributed throughout the system. It may be a suite of high-performance machines tightly interconnected by a fast, dedicated network and used to process a set of production tasks, where the communicating subtasks of each task may execute on different machines in the suite. It may also be a special-purpose embedded system, such as a set of different types of processors working together to perform a particular application. In one extreme, it may consist of a single machine that can reconfigure itself to operate in different ways (e.g., in different modes of parallelism). All of these types of heterogeneous computing systems (as well as others, e.g., grids and clusters) are appropriate topics for this workshop series.

I hope you find the contents of these proceedings informative and interesting. I encourage you to look also at the proceedings of past and future HCWs.

Many people have worked very hard to make this year’s workshop happen. Henri Casanova, a well known and respected researcher from the University of Hawai’i, was this year’s Program Committee Chair. He worked diligently with the Program Committee (listed elsewhere in these proceedings) to assemble the excellent program for the workshop. José A. B. Fortes, from the University of Florida, was the General Chair. José has been a personal friend and colleague of mine for over 20 years, and I greatly respect him as person and as a professional. José was responsible for the overall organization and administration of this year’s workshop, and he did a fine job. Given his experience as the Program Chair of HCW 2006, he provided valuable guidance to Henri (as Henri will do as the General Chair for HCW 2008). I thank Henri, José, and the Program Committee for their efforts. I also thank the workshop Steering Committee for their oversight and assistance.

The workshop is once again cosponsored by the IEEE Computer Society and the US Office of Naval Research. I thank the Office of Naval Research for their support of this workshop's proceedings. This workshop is held in conjunction with the International Parallel and Distributed Processing Symposium (IPDPS), which is a merger of the symposia formerly known as the International Parallel Processing Symposium (IPPS) and the Symposium on Parallel and Distributed Processing (SPDP). The Heterogeneity in Computing Workshop series is very appreciative of the cooperation and assistance we have received from the IPDPS/IPPS organizers for all of the workshop's 16 years.

H. J. Siegel  
Colorado State University

## Message from the HCW General Chair



Welcome to HCW 2007, the 16<sup>th</sup> workshop of the HCW series of meetings. Starting this year, on the recommendation of the Steering Committee and feedback from HC researchers, the acronym HCW stands for Heterogeneity in Computing Workshop. This reflects the pervasive nature of heterogeneity, which now impacts all aspects of computing, including not only platforms and algorithms, but also systems software, interfaces, computing models, applications, etc. We hope that HCW 2007 will be the first of a long series of meetings where international scientists gather to present and exchange ideas on this increasingly important area of computing research.

This year's workshop continues to build on the successful association of HCW with the IPDPS meeting. The framework and infrastructure support provided by the IPDPS umbrella for its associated workshops, including HCW, has proven to be a mutually beneficial arrangement. It is a pleasure to acknowledge the success and efforts of the IPDPS and HCW organizing teams in this continuing relationship.

Among the many people who have contributed to HCW 2007, several deserve a special mention and thanks. Henri Casanova, the Program Chair, did an excellent job in all tasks (and more) needed to bring about an exciting technical program: constituting a high-quality program committee, organizing the review process, identifying keynote speakers and supporting the workshop website. H. J. Siegel, the Steering Chair Committee, was instrumental in providing advice and continuity wisdom when and where needed in the process of organizing HCW. Alan Sussman, the IPDPS Workshops Committee Chair, coordinated and provided a clear liaison between HCW and the IPDPS organization.

Last but not least, it is a pleasure to thank the workshop sponsors: ONR, the U.S. Office of Naval Research; the IEEE Computer Society, through the Technical Committee on Parallel Processing (TCPP); and the Advanced Computing and Information Systems (ACIS) laboratory of the University of Florida.

I wish you all a productive and enjoyable workshop in sunny Long Beach, California.

José A. B. Fortes  
University of Florida

## Message from the HCW Program Chair



Let me add my welcome to HCW 2007 to those of the Steering Committee and General Chair. The international Technical Program Committee (TPC) has invested a lot of time and effort in putting together a program that we hope workshop attendees and participants will find technically valuable as well as intellectually stimulating.

The 10 papers in the proceedings were selected from 21 submissions based on several criteria, including technical soundness, originality, and appropriateness to the workshop. Each submission was reviewed by at least three TCP members, possibly with the help of external reviewers. I wish to thank all TCP members for their hard work in evaluating and discussing the papers. Special thanks are due to external reviews: Vineet Chadha, Kaoutar El Maghraoui, Emmanuel Jeannot, Jean-Sébastien Gay. Finally, I wish to thank all authors who submitted their work to HCW'2007.

The entire HCW'2007 Organizing Committee is delighted to have two outstanding Keynote Speakers this year. The first speaker is Dr. Thomas Sterling, a Professor in the Dept. of Computer Science and the Center of Computation and Technology at Louisiana State University, a Faculty Associate at the Center for Advance Computation Research at the California Institute of Technology, and a Distinguished Visiting Scientist at the Computing and Computational Sciences Directorate at the Oak Ridge National Laboratory. The second speaker is Dr. Dean Tullsen, a Professor in the Computer Science and Engineering at the University of California, San Diego. Both speakers will share with workshop attendees their unique perspectives on heterogeneous computing today and their vision for the future.

I am personally very grateful to H.J. Siegel, Chair of the HCW Steering Committee, and José Fortes, General Chair of HCW'2007, for their sound advice and constant guidance for putting together the HCW program. I also want to thank Alan Sussman, the IPDPS Workshop Chair, for helping with the logistics of the paper reviewing system and with publication of the proceedings, and for always being quick to answer the many questions I had along the way.

Henri Casanova  
University of Hawai'i at Manoa