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# High Performance Computing – HiPC 2004

11th International Conference  
Bangalore, India, December 19-22, 2004  
Proceedings

Volume Editors

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## MESSAGE FROM THE PROGRAM CHAIR

Welcome to the proceedings of the 11th International Conference on High Performance Computing, HiPC 2004!

This year, we were delighted to receive 253 submissions to this conference from more than 25 different countries, including (besides India!) countries in North and South America, Europe, Asia, and Australia. This is a major increase on last year (169 submissions from 20 countries). Eventually, 48 submissions (the same number as last year) from 13 different countries were selected for presentation at the conference and publication in the conference proceedings.

This sharp increase in the number of submissions required adapting the regular selection process used in the previous years. First, all submitted papers were carefully considered by the Program Chair and Vice-Chairs to check their consistency with the minimal syntactic requirements for acceptance. At the end of this first stage, we were left with 214 submissions, which were further considered by the Program Committee. Each of these papers was reviewed by three Program Committee members. As many as 632 reviews were collected (2.95 per paper on average) and each paper was discussed at the online Program Committee meeting. Finally, 48 out of 214 (22%) were accepted for presentation and publication in the proceedings. Among them, two outstanding papers were selected as “Best Papers”; one in the algorithms and applications area and the other in the systems area. They will be presented in a separate plenary session and each paper will be awarded a prize sponsored by InfoSys. Here is a general summary of the results with respect to the origins of the submissions:

Submission origin	Reviewed	Accepted	Acceptance rate
Overall	214	48	22%
India	43%	31%	16%
Asia except India	17%	15%	19%
North America (mainly USA)	20%	42%	46%
Elsewhere (mainly Europe)	20%	12%	13%
Total	100%	100%	

These figures show that the selection process was highly competitive. We were pleased to accommodate eight (parallel) technical sessions of high-quality contributed papers, plus the special plenary “Best Papers” session. In addition, this year’s conference also featured a Poster Session, an Industrial Track Session, six Keynote Addresses, six Tutorials and six Workshops.

It was a pleasure putting together this program with the help of five excellent Program Vice-Chairs and their 73 Program Committee members. The hard work of all the Program Committee members is deeply appreciated, and I especially wish to acknowledge the dedicated effort put in by the Vice-Chairs: Frédéric Desprez (Algorithms), Ramesh Govindan (Communication Networks), Thilo Kielmann (System Software), Frank Mueller (Applications), and Per Stenström (Architecture). Without their help and

timely work, the quality of this program would not be as high nor would the process have run so smoothly.

I also wish to thank the other supporting cast members who helped in putting together this program, including those who organized the keynotes, tutorials, workshops, awards, poster session, industrial track session, and those who performed the administrative functions that are essential to the success of this conference. The work of Sushil K. Prasad in putting together the conference proceedings is also acknowledged, as well as the support provided by Mathieu Jan and Sébastien Monnet, PhD students at IRISA, in maintaining the CyberChair online paper submission and evaluation software. Last, but certainly not least, I express heartfelt thanks to our General Co-chairs, Viktor Prasanna and Uday Shukla, and to the Vice-General Chair, David A. Bader, for all their useful advice.

The preparation of this conference was unfortunately marked by a very sad and unexpected event: the sudden demise of Dr. Uday Shukla, who was a strong supporter of HiPC over the past ten years. He passed away on July 20, 2004 after a very brief illness. Dr. Shukla had been involved in organizing HiPC since the beginning. In addition to his encouragement in organizing HiPC, Dr. Shukla was a strong supporter of research activities in computer science and information technology in India. We will miss a friend of HiPC.

I would like to end this message by thanking the Conference General Co-chairs for giving me the opportunity to serve as the Program Chair of this conference. This truly was a very rewarding experience for me. I trust the attendees found this year's program to be as informative and stimulating as we endeavored to make it. I hope they enjoyed their HiPC 2004 experience, and I hope they also found time to enjoy the rich cultural experience provided by the fascinating city of Bangalore, India!

December 2004

Luc Bougé

## MESSAGE FROM THE STEERING CHAIR

It is my pleasure to welcome you to the proceedings of the 11th International Conference on High Performance Computing, held in Bangalore, the IT capital of India.

I would like to single out the contributions of Luc Bougé, Program Chair, for organizing an excellent technical program. We received a record number of submissions this year, surpassing our previous high set last year. Also, the submissions were from a record number of countries. I am grateful to him for his efforts and thoughtful inputs in putting together the meeting program.

Many volunteers continued their efforts in organizing the meeting. While I thank them for their invaluable efforts, I would like to welcome R. Badrinath, India Publicity Chair, Susamma Barua, Registration Chair, and Sally Jelinek, Local Arrangements Co-chair, to the “HiPC family.” Bertil Schmidt acted as our Cyber Chair. Rajeev Muralidhar of Intel India, though not listed in our announcements, was a great asset to us in handling meeting arrangements and interfacing with local institutions. I would like to thank all our volunteers for their tireless efforts. The meeting would not have been possible without the enthusiastic commitment of these individuals.

Major financial support for the meeting was provided by several leading IT companies in India. I would like to acknowledge the following individuals for their support: N.R. Narayana Murthy, Infosys; Venkat Ramana, Hinditron Infosystems; Uday Shukla, IBM India; Dinakar Sitaram, HP India; and V. Sridhar, Satyam.

Finally, I would like to thank Animesh Pathak at USC for his continued assistance and enthusiasm in organizing the meeting. He, along with the volunteers listed earlier, pulled together as a team to meet the several challenges presented this year.

This message would not be complete without the posthumous acknowledgement of our debt to Uday Shukla whose contributions remain pivotal to this event as a “home-grown” undertaking to showcase India’s IT accomplishments. We honor his spirit by carrying forward the organization and presentation of this program.

December 2004

Viktor K. Prasanna

## MESSAGE FROM THE VICE-GENERAL CHAIR

Welcome to the proceedings of the 11th International Conference on High Performance Computing, held in Bangalore. It was an honor and a pleasure to be able to serve the international community by bringing together researchers, scientists, and students, from academia and industry, to this meeting in the technology capital of India.

First let me recognize Manish Parashar for his help publicizing this conference, and Sushil K. Prasad for serving as the publications chair. Srinivas Aluru did an excellent job organizing tutorials presented by leading experts. HiPC 2004 included six tutorials in areas likely to be at the forefront of high-performance computing in the next decade, such as storage and file systems with InfiniBand, pervasive computing, grid computing for e-science and e-business, new networking technologies, network security, and embedded system design.

I wish to thank all of the conference organizers and volunteers for their contributions in making HiPC 2004 a great success. I would especially like to thank the general co-chairs, Viktor K. Prasanna and Uday Shukla, for their enormous contributions steering and organizing this meeting. It is to their credit that this meeting has become the premier international conference for high-performance computing. With deep sorrow, we will miss Dr. Uday Shukla, whose leadership and strong support of research activities in computer science and information technology in India was remarkable. Special thanks are also due to the program chair, Luc Bougé, for his hard work assembling a high-quality technical program that included contributed and invited papers, an industrial track, keynote addresses, tutorials, and several workshops.

December 2004

David A. Bader

# A TRIBUTE TO DR. UDAY SHUKLA



Dr. Uday Shukla

1951–2004

In tribute to his pioneering  
leadership and contributions to India's  
advanced computing technology

Uday Shukla passed away on July 20, 2004 at the age of 53. He leaves behind his wife Rekha, son Nitish and daughter Vinita, and we extend to them our deepest sympathy and condolences.

In his passing, the information technology industry has lost not only a visionary but also a rare individual with a capacity to inspire a technology-savvy generation to innovate. For HiPC, his loss has been profound, with our organization having come to rely on his leadership in India and on the world-wide recognition and alliances that he brought to the event. Here we pay tribute to his many accomplishments, as highlighted in a brief resume of his professional associations and undertakings.

Dr. Shukla joined IBM India (then Tata Information Systems Ltd., a joint venture between IBM and Tata) in 1994 as the head of the Systems Group. He was the director of IBM Software Labs, India and IBM Engineering & Technology Services, India when he passed away. Prior to joining IBM, he was the head of R&D at Tata Elxsi following his tenure as the location head of the Centre for the Development of Advanced Computing, Bangalore. He received his PhD in aerospace engineering from the Indian Institute of Science, Bangalore. He was a fellow of the Institution of Engineers (India), and a senior member of IEEE.

In the years following, Dr. Shukla took on the task of moving IBM's Indian operations to the cutting edge of technology. His focus was on creating a climate that would nurture young talent and set them on the path of pursuing and implementing innovative ideas. His efforts in this direction included the creation of an R&D group, a Technology Incubation Centre, the Centre for Advanced Studies, a University Relationships program, an affiliate of the IBM Academy of Technology, and an in-house lecture series on science and technology. The in-house lecture series covers topics like quantum computing, molecular biology, formal mathematical systems, and algorithms.

Collectively these activities helped generate science-based intellectual property and a research environment that is rather unique. A large number of patent applications filed under his leadership have been in areas such as compiler optimization, molecular biology, and operating systems. These initiatives were based on his faith in the unusual problem-solving capabilities of the people he was leading in India. While the journey to achieving technological excellence is long and tedious, Shukla was able to firmly establish basic elements that motivate talented researchers to stay the course, through

an awareness of the importance of basic science in the development of technology and the importance of an ethical environment. He had the pleasure of seeing at least a dozen of his colleagues well on the path to becoming prolific inventors and dozens more filing their first patent application. In addition, his encouragement emboldened a few very young engineers to make a mark as researchers in molecular biology.

His association with HiPC was an important part of his dream, and he was involved in organizing HiPC from its beginning. As the co-chair of the Workshop on Cutting Edge Computing since 2001, he sought to enhance the image of HiPC by inviting papers from experts in new and emerging technologies. He was also active in bringing together colleagues in India to form a National Advisory Committee for the event, often working in the background with organizers to develop local participation and support. He gave generously of his professional wisdom and organizational energy, serving as the general co-chair of HiPC in 2002 and then again signing on to co-chair HiPC 2004. In addition to his encouragement for organizing HiPC, Dr. Shukla remained a strong supporter of research activities in computer science and information technology in India. We will miss this friend of HiPC.

October 2004

Viktor K. Prasanna

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Hainzer, Stefan

XVIII Organization

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Zhang, Guangsen  
Zhang, Hui  
Zhang, Qingfu  
Zhang, Xiangyu  
Zhang, Xiaodong  
Zhao, Ming  
Zomaya, Albert Y.

# Table of Contents

## Keynote Addresses

Rethinking Computer Architecture Research <i>Arvind</i> .....	1
Event Servers for Crisis Management <i>K. Mani Chandy</i> .....	3
DIET: Building Problem Solving Environments for the Grid <i>Frédéric Desprez</i> .....	4
The Future Evolution of High-Performance Microprocessors <i>Norman P. Jouppi</i> .....	5
Low Power Robust Computing <i>Trevor Mudge</i> .....	6
Networks and Games <i>Christos Papadimitriou</i> .....	7

## Plenary Session - Best Papers

An Incentive Driven Lookup Protocol for Chord-Based Peer-to-Peer (P2P) Networks <i>Rohit Gupta, Arun K. Somani</i> .....	8
A Novel Battery Aware MAC Protocol for Ad Hoc Wireless Networks <i>S. Jayashree, B.S. Manoj, C. Siva Ram Murthy</i> .....	19

## Session I - Wireless Network Management

Dynamic Topology Construction in Bluetooth Scatternets <i>Rajarshi Roy, Mukesh Kumar, Navin K. Sharma, Shamik Sural</i> .....	30
Efficient Secure Aggregation in Sensor Networks <i>Pawan Jadia, Anish Mathuria</i> .....	40
Optimal Access Control for an Integrated Voice/Data CDMA System <i>Shruti Mahajan, Manish Singh, Abhay Karandikar</i> .....	50

Adaptive Load Balancing of a Cellular CDMA Systems Considering Non-uniform Traffic Distributions  
*Kuo-Chung Chu, Frank Yeong-Sung Lin* . . . . . 60

An Active Framework for a WLAN Access Point Using Intel’s IXP1200 Network Processor  
*R. Sharmila, M.V. LakshmiPriya, Ranjani Parthasarathi* . . . . . 71

MuSeQoR: Multi-path Failure-Tolerant Security-Aware QoS Routing in Ad Hoc Wireless Networks  
*S. Sriram, T. Bheemarjuna Reddy, B.S. Manoj, C. Siva Ram Murthy* . . . . . 81

**Session II - Compilers and Runtime Systems**

A Tunable Coarse-Grained Parallel Algorithm for Irregular Dynamic Programming Applications  
*Weiguo Liu, Bertil Schmidt* . . . . . 91

A Feedback-Based Adaptive Algorithm for Combined Scheduling with Fault-Tolerance in Real-Time Systems  
*Suzhen Lin, G. Manimaran* . . . . . 101

A Shared Memory Dispatching Approach for Partially Clairvoyant Schedulers  
*K. Subramani, Kiran Yellajyosula* . . . . . 111

Data Redistribution Algorithms for Homogeneous and Heterogeneous Processor Rings  
*Hélène Renard, Yves Robert, Frédéric Vivien* . . . . . 123

Effect of Optimizations on Performance of OpenMP Programs  
*Xinmin Tian, Milind Girkar* . . . . . 133

Sparse Matrices in MATLAB\*P: Design and Implementation  
*Viral Shah, John R. Gilbert* . . . . . 144

**Session III - High-Performance Scientific Applications**

Architecture and Early Performance of the New IBM HPS Fabric and Adapter  
*Rama K. Govindaraju, Peter Hochschild, Don Grice, Kevin Gildea, Robert Blackmore, Carl A. Bender, Chulho Kim, Piyush Chaudhary, Jason Goscinski, Jay Herring, Steven Martin, John Houston* . . . . . 156

Scheduling Many-Body Short Range MD Simulations on a Cluster of Workstations and Custom VLSI Hardware <i>J. V. Sumanth, David R. Swanson, Hong Jiang</i> .....	166
Performance Characteristics of a Cosmology Package on Leading HPC Architectures <i>Jonathan Carter, Julian Borrill, Leonid Oliker</i> .....	176
A Dynamic Geometry-Based Shared Space Interaction Framework for Parallel Scientific Applications <i>Li Zhang, Manish Parashar</i> .....	189
Earthquake Engineering Problems in Parallel Neuro Environment <i>Sanjay Singh, S.V. Barai</i> .....	200
Parallel Simulation of Carbon Nanotube Based Composites <i>Jyoti Kolhe, Usha Chandra, Sirish Namilae, Ashok Srinivasan, Namas Chandra</i> .....	211
<b>Session IV - Peer-to-Peer and Storage Systems</b>	
Design of a Robust Search Algorithm for P2P Networks <i>Niloy Ganguly, Geoff Canright, Andreas Deutsch</i> .....	222
Efficient Immunization Algorithm for Peer-to-Peer Networks <i>Hao Chen, Hai Jin, Jianhua Sun, Zongfen Han</i> .....	232
Leveraging Public Resource Pools to Improve the Service Compliances of Computing Utilities <i>Shah Asaduzzaman, Muthucumar Maheswaran</i> .....	242
Plethora: An Efficient Wide-Area Storage System <i>Ronaldo A. Ferreira, Ananth Grama, Suresh Jagannathan</i> .....	252
iSAN - An Intelligent Storage Area Network Architecture <i>Ganesh Narayan, K. Gopinath</i> .....	262
<b>Session V - High-Performance Processors and Routers</b>	
Static Techniques to Improve Power Efficiency of Branch Predictors <i>Tao Zhang, Weidong Shi, Santosh Pande</i> .....	274

Realistic Workload Scheduling Policies for Taming the Memory Bandwidth Bottleneck of SMPs <i>Christos D. Antonopoulos, Dimitrios S. Nikolopoulos, Theodore S. Papatheodorou</i> . . . . .	286
A Parallel State Assignment Algorithm for Finite State Machines <i>David A. Bader, Kamesh Madduri</i> . . . . .	297
A Novel Scheme to Reduce Burst-Loss and Provide QoS in Optical Burst Switching Networks <i>Ashok K. Turuk, Rajeev Kumar</i> . . . . .	309
Single FU Bypass Networks for High Clock Rate Superscalar Processors <i>Aneesh Aggarwal</i> . . . . .	319
DSP Implementation of Real-time JPEG2000 Encoder Using Overlapped Block Transferring and Pipelined Processing <i>Byeong-Doo Choi, Min-Cheol Hwang, Ju-Hun Nam, Kyung-Hoon Lee, Sung-Jea Ko</i> . . . . .	333
<b>Session VI - Grids and Storage Systems</b>	
Dynamic Load Balancing for a Grid Application <i>Menno Dobber, Ger Koole, Rob van der Mei</i> . . . . .	342
Load Balancing for Hierarchical Grid Computing: A Case Study <i>Chunxi Chen, Bertil Schmidt</i> . . . . .	353
A-FAST: Autonomous Flow Approach to Scheduling Tasks <i>Sagnik Nandy, Larry Carter, Jeanne Ferrante</i> . . . . .	363
Integration of Scheduling and Replication in Data Grids <i>Anirban Chakrabarti, R. A. Dheepak, Shubhashis Sengupta</i> . . . . .	375
Efficient Layout Transformation for Disk-Based Multidimensional Arrays <i>Sriram Krishnamoorthy, Gerald Baumgartner, Chi-Chung Lam, Jarek Nieplocha, P. Sadayappan</i> . . . . .	386
Autonomic Storage System Based on Automatic Learning <i>Francisco Hidrobo, Toni Cortes</i> . . . . .	399

## Session VII - Energy-Aware and High-Performance Networking

Broadcast Based Cache Invalidation and Prefetching in Mobile Environment <i>Narottam Chand, Ramesh Joshi, Manoj Misra</i> . . . . .	410
Efficient Algorithm for Energy Efficient Broadcasting in Linear Radio Networks <i>Gautam K. Das, Sandip Das, Subhas C. Nandy</i> . . . . .	420
Characterization of OpenMP Applications on the InfiniBand-Based Distributed Virtual Shared Memory System <i>Inho Park, Seon Wook Kim, Kyung Park</i> . . . . .	430
Fast and Scalable Startup of MPI Programs in InfiniBand Clusters <i>Weikuan Yu, Jiasheng Wu, Dhabaleswar K. Panda</i> . . . . .	440
Parallel Performance of Hierarchical Multipole Algorithms for Inductance Extraction <i>Hemant Mahawar, Vivek Sarin, Ananth Grama</i> . . . . .	450

## Session VIII - Distributed Algorithms

A New Adaptive Fault-Tolerant Routing Methodology for Direct Networks <i>M.E. Gómez, J. Duato, J. Flich, P. López, A. Robles, N.A. Nordbotten, T. Skeie, O. Lysne</i> . . . . .	462
Fast and Efficient Submesh Determination in Faulty Tori <i>R. Pranav, Lawrence Jenkins</i> . . . . .	474
High Performance Cycle Detection Scheme for Multiprocessing Systems <i>Ju Gyun Kim</i> . . . . .	484
Improved Quality of Solutions for Multiobjective Spanning Tree Problem Using Distributed Evolutionary Algorithm <i>Rajeev Kumar, P. K. Singh, P. P. Chakrabarti</i> . . . . .	494
Simple Deadlock-Free Dynamic Network Reconfiguration <i>Olav Lysne, José Miguel Montañana, Timothy Mark Pinkston, José Duato, Tor Skeie, José Flich</i> . . . . .	504
Lock-Free Parallel Algorithms: An Experimental Study <i>Guojing Cong, David Bader</i> . . . . .	516
<b>Author Index</b> . . . . .	529