
Preface

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Biographical notes: Ruppa K. Thulasiram is an Associate Professor and a research affiliate with the Institute of Industrial Mathematical Sciences of the University of Manitoba. His research interests are in computational finance, mobile commerce, high performance scientific computing, and numerical algorithms.

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This special issue contains revised and extended versions of selected presentations from the 18th annual International Symposium on High Performance Computing Systems and Applications (HPCS 2004), which was held at the Delta Winnipeg Hotel, Winnipeg, Manitoba, Canada from May 16–19, 2004. This special issue represents the wide coverage of topics in high performance computing such as performance evaluation (3 papers), systems and networking (4 papers), science and engineering applications (3 papers), and finance applications (2 papers). It was a difficult choice selecting these papers from among those presented at the conference. We used the original conference reviewer reports to select the 12 papers and then invited the authors to consider extending their conference papers. All authors accepted our invitation and provided extensive new material in some cases. The revised papers were further reviewed by a third independent reviewer who provided an additional set of recommendations to the authors.

In the performance evaluation area we have three papers: ‘Performance evaluation of the Sun Fire Link SMP clusters’, by Ying Qian, Ahmad Afsahi, Nathan R. Fredrickson and Reza Zamani, ‘On the performance of parallel implementations of an ADI scheme for parabolic equations with mixed derivatives using multithreads and MPI’, by Baolai Ge and ‘Performance evaluation for

neuron transport application using message passing’, by Mohammed Dahmani, Benoit Morin and Robert Roy.

In the systems and networking area we have four papers: ‘Queuing algorithms for speculative Network Processors’, by Jurgen Foag and Thomas Wild, ‘Communication issues within HPC grids’, by Robert D. McLeod, Sheng Huang, Marek Laskowski and Sajid Hussain, ‘Adaptative time/space sharing with SCOJO’, by Angela Sodan and Xuemin Huang and ‘Performance assessment of four cluster interconnects on identical hardware: hints for cluster builders’, by Hossein Pourreza, Rasit Eskicioglu and Peter Graham.

In the science and engineering applications area we have three papers: ‘Solving the Dynamic Plant Layout Problem using a new hybrid meta-heuristic approach’, by Jose M. Rodriguez, F. Chris MacPhee, David J. Bonham and Virendra C. Bhavsar, ‘MPI scalability of a large memory LES code’, by Mesbah Uddin and Andrew Pollard and ‘A new fast parallel statistical measurement technique for computational cosmology’, by Rob Thacker and H.M.P. Couchman.

Finally in the unconventional and emerging finance application area we have two papers: ‘A second order L_0 stable algorithm for evaluating European options’, by Ruppa K. Thulasiram, Chen Zhen, Amit Chhabra, Parimala Thulasiraman and Abba B. Gumel and ‘A parallel

quasi-Monte Carlo approach to pricing multidimensional American options', by Justin W.L. Wan, Kevin Lai, Adam W. Kolkiewicz and Ken S. Tan.

As can be seen from these titles, this special volume represents a wide variety of research activities with high performance computing relevance. The scope of high performance computing is ever expanding and in the

coming years this field will be challenged to help provide solutions to problems from fire simulation to financial risk management and weather prediction to disease management (e.g., SARS and AIDS). We hope that these papers will have significant archival value for future research in high performance computing.