

2012 19th International Conference on High Performance Computing

(HiPC 2012)

**Pune, India
18 – 22 December 2012**



**IEEE Catalog Number: CFP12176-PRT
ISBN: 978-1-4673-2372-7**



Program

Conference Papers

GPU Computing

[GrABFAST: A CUDA based GPU Accelerated Fast Short Sequence Alignment Algorithm](#) """"3
Ankur Narang, Jyothish Soman, Sheetal Lahabar

[Massively parallel Landscape-Evolution Modelling using General Purpose Graphical Processing Units](#) """"33
Stephen McGough, Darrel Maddy, Adam Trueman, John Wainwright, Shun Liang, Markas Rapoportas, Ryan Grey, Ganesh Kumar Vinod

[Automatic efficient data layout for multithreaded stencil codes on CPUs and GPUs](#) """"43
Julien Jaeger, Denis Barthou

[GPU Task Parallelism for Scalable Anomaly Detection](#) """"53
Koji Ueno, Toyotaro Suzumura

[GMProf: A Low-Overhead, Fine-Grained Profiling Approach for GPU Programs](#) """"63
Mai Zheng, Vignesh Ravi, Wenjing Ma, Feng Qin, Gagan Agrawal

[CU2rCU: towards the Complete rCUDA Remote GPU Virtualization and Sharing Solution](#) """"73
Carlos Reño, Antonio J. Peña, Federico Silla, Jose Duato, Rafael Mayo, Enrique S. Quintana-Ortíz

Parallel Algorithms

[Shared Memory Parallelization of Fully-Adaptive Simulations Using a Dynamic Tree-Split and Join Approach](#) """"83
Martin Schreiber, Hans-Joachim Bungartz, Michael Bader

[Task-based Parallel Breadth-First Search in Heterogeneous Environments](#) """"93
Lluís-Miquel Munguía, David A. Bader, Eduard Ayguade

[Parallel Hierarchical Clustering on Shared Memory Platforms](#) """": 3
William Hendrix, Md. Mostofa Ali Patwary, Ankit Agrawal, Wei-keng Liao, Alok Choudhary

[Dynamic Load-Balancing with Variable Number of Processors based on Graph Repartitioning](#) """; 2
Aurélien Esnard, Clément Vuchener

[Efficient update of ghost regions using active messages](#) """; ;
Josh Milthorpe, Alistair P Rendell

[A Hybrid Parallel Algorithm for Computing and Tracking Level Set Topology](#) ""32:
Senthilnathan Maadasamy, Harish Doraiswamy, Vijay Natarajan

System software

[Optimizing Resource Utilization with software-based Temporal Multi-Threading \(sTMT\)](#) ""33:
Vicenç Beltran, Eduard Ayguade

[A Global Address Space Approach to Automated Data Management for Parallel Quantum Monte Carlo Applications](#) ""34:
Qingpeng Niu, James Dinan, Sravya Tirukkoyalur, Lubos Mitas, Lucas Wagner, Ponnuswamy Sadayappan

[Design and Implementation of a Parallel Priority Queue on Many-core Architectures](#) ""35:
Xi He, Dinesh Agarwal, Sushil K. Prasad

[OSQR: A Framework for Ontology-based Semantic Query Routing in Unstructured P2P Networks](#) ""36:
Rasanjalee Dissanayaka Mudiyansele, Sham Navathe, Sushil K. Prasad

[A Load-sharing Architecture for High Performance Optimistic Simulations on Multi-core Machines](#) ""37:
Roberto Vitali, Alessandro Pellegrini, Francesco Quaglia

[Optimization of the Hop-Byte Metric for Effective Topology Aware Mapping](#) ""38:
C. D. Sudheer, Ashok Srinivasan

Fault-Tolerance and Scheduling

[A Fault-Tolerant Environment for Large-Scale Query Processing](#) ""399
Mehmet Kurt, Gagan Agrawal

[Campaign Scheduling](#) ""3: 9
Vinicius Gama Pinheiro, Krzysztof Rzdca, Denis R. Trystram

[Fault Tolerant Parallel Data-Intensive Algorithms](#) ""3: 9
Mucahid Kutlu, Gagan Agrawal, Oguz Kurt

[A fault tolerant self-scheduling scheme for parallel loops on shared memory systems](#) ""429
Yizhuo Wang, Alex Nicolau, Rosario Cammarota, Alex Veidenbaum, University of California, Irvine, USA

[Energy-aware scheduling under reliability and makespan constraints](#) ""439
Guillaume Aupy, Anne Benoit, Yves Robert

[Workload Dependent IO Scheduling for Fairness and Efficiency in Shared Storage Systems](#) ""449
Ajay Gulati, Arif Merchant, Mustafa Uysal, Pradeep Padala, Peter Varman

Parallel Algorithms and Applications

[Distributed Hierarchical Co-clustering and Collaborative Filtering Algorithm](#) ""459
Ankur Narang, Abhinav Srivastava, Naga Praveen Kumar Katta

[Mapping Strategies for the PERCS Architecture](#) ""469
Venkatesan T Chakaravarthy, Naga Praveen Kumar Katta, Monu Kedia, Ramakrishnan Rajamony, Aruna Ramanan, Yogish Sabharwal

[Parallelization of Faugere's Improved F4 Algorithm](#) ""479
Yashodhan Karandikar, Prakrati Agrawal, Habeeb Syed, Jojumon Kavalan

[Scalable Performance of ScaleGraph for Large Scale Graph Analysis](#) ""487
Miyuru Dayarathna, Charuwat Hounkaew, Hidefumi Ogata, Toyotaro Suzumura

[Sparse Matrix-Matrix Multiplication on Modern Architectures](#) ""496
Kiran Matam, Siva Rama Krishna Bharadwaj Indrapu, Kishore Kothapalli

[Password Recovery Using MPI and CUDA](#) ""4: 6
David Apostol, Kyle Foerster, Amrita Chatterjee, Travis Desell

Networking, I/O and File Systems

[Designing Scalable PGAS Communication Subsystems on Cray Gemini Interconnect](#) ""4; 5
Abhinav Vishnu, Jeff Daily, Bruce Palmer

[The Design and Implementation of a Multi-level Content-Addressable Checkpoint File System](#) ""525
Abhishek Kulkarni, Adam Manzanares, Latchesar Ionkov, Michael Lang, Andrew Lumsdaine

[I/O Efficient QR and QZ Algorithms](#) ""535
Sraban Kumar Mohanty, Sajith Gopalan

[A Theory and Methodology for Combining Data Centre Networks](#) ""544
Frank Olaf Sem-Jacobsen, Ralph Lorentzen, Olav Lysne

[I/O Performance Characterization of Lustre and NASA Applications on Pleiades](#) ""552
Subhash Saini, Jason Rappleye, Johnny Chang, David Barker, Piyush Mehrotra, Rupak Biswas

[A Scalable Messaging System for Accelerating Discovery from Large Scale Scientific Simulations](#) ""562
Tong Jin, Fan Zhang, Manish Parashar, Scott Klasky, Norbert Podhorszki, Hasan Abbasi

Virtualization and Cloud Computing

[VMAP: Proactive Thermal-aware Virtual Machine Allocation in HPC Cloud Datacenters](#) ""572
Eunkyung Lee, Hariharasudhan Viswanathan, Dario Pompili

[Executing a Biological Sequence Comparison Application on a Federated Cloud Environment](#) ""582
Alessandro Ferreira Leite, Alba Cristina Magalhaes Alves de Melo

[Modern HPC cluster virtualization using KVM and Palacios](#) ""58;
Alexander Kudryavtsev, Vladimir Koshelev, Arutyun Avetisyan

[Intrusion Detection Techniques for Virtual Domains](#) ""59:
Udaya Tupakula, Vijay Varadharajan, Dipankar Dutta

[ElastiCat: A load rebalancing framework for cloud-based key-value stores](#) ""5: 9
Xiulei Qin, Wei Wang, Wenbo Zhang, Jun Wei, Xin Zhao, Tao Huang



HiPC-12 Workshops Proceedings

Workshop on Performance Engineering and Applications (WEPA)

[Efficient Cache Exploration Method for a Tiled Chip Multiprocessor](#) ""5; 9
Aparna Mandke Dani, Y.N. Srikant, Bharadwaj Amrutur

[Eiger: A Framework for the Automated Synthesis of Statistical Performance Models](#) ""625
Andrew Kerr, Eric Anger, Gilbert Hendry, Sudhakar Yalamanchili

[Energy aware Colocation of Workload in Data centers](#) ""62;
Madhurima Pore, Zahra Abbasi, Sandeep K. S. Gupta, Georgios Varsamopoulos

[Tool for Performance Tuning and Regression Analyses of HPC Systems and Applications](#) ""637
Saumil Merchant, Giri Prabhakar

[Profiling and scalability of the high resolution NCEP model for Weather and Climate Simulations](#) ""643
R Phani, A.K. Sahai, Suryanarana A Rao, SMD Jeelani

Workshop on Parallel Algorithms and Software for Analysis of Massive Graphs (ParGraph)

[Towards Highly Scalable X10 Based Spectral Clustering](#) ""648
Hidefumi Ogata, Miyuru Dayarathna, Toyotaro Suzumura

[Towards Scalable Optimal Sequence Homology Detection](#) ""653
Jeff Daily, Sriram Krishnamoorthy, Ananth Kalyanaraman

International Workshop on Cloud Computing Applications (IWCA)

[An Automatic Machine Scaling Solution for Cloud Systems](#) ""65;
Marta Beltran, Antonio Guzman

[Moving to the Cloud: Workload Migration Techniques and Approaches](#) ""66;
Joydip Banerjee

[Shared Disk Big Data Analytics with Apache Hadoop](#) ""677
Anirban Mukherjee, Joydip Datta, Raghavendra Jorapur, Ravi Singhvi, Saurav Holo, Wasim Akram

[Framework and User Migration Strategy of Cloud-Based Video Conference Multi-Gateway System](#) ""683
Hongen Feng, Wenjun Wu

Workshop on Massive Data Analytics on Scalable Systems (DataMASS)

[A New Method for Face Recognition with Fewer Features under Illumination and Expression Variations](#) ""68;
Chandan Tripathi, K.P. Singh

[A Distributed Abnormal Packet Generation Engine Based on MapReduce](#) ""69:
Qi-fei Zhang, Hong-bin Lv, Xue-Zheng Pan, Chao Wang, Wen-juan Li

[Visualization of Network Data Provenance](#)'''''''6: 5

Peng Chen, Beth Plale, You-Wei Cheah, Devarshi Ghoshal, Scott Jensen, Yuan Luo