

2015 27th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2015)

**Florianopolis, Brazil
17-21 October 2015**



**IEEE Catalog Number: CFP15307-POD
ISBN: 978-1-4673-8012-6**

**Copyright © 2015 by the Institute of Electrical and Electronic Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP15307-POD
ISBN (Print-On-Demand):	978-1-4673-8012-6
ISBN (Online):	978-1-4673-8011-9
ISSN:	1550-6533

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

2015 27th International Symposium on Computer Architecture and High Performance Computing

SBAC-PAD 2015

Table of Contents

Message from the General Chair.....	ix
Message from the Program Chairs	x
Committees.....	xi
Keynotes.....	xv

Session 1: Applications and Algorithms Using Hardware Accelerators

Towards Seismic Wave Modeling on Heterogeneous Many-Core Architectures Using Task-Based Runtime System	1
<i>Victor Martínez, David Michéa, Fabrice Dupros, Olivier Aumage, Samuel Thibault, Hideo Aochi, and Philippe O.A. Navaux</i>	
Optimized Parallel Label Propagation Based Community Detection on the Intel(R) Xeon Phi(TM) Architecture	9
<i>Andrei B. Khlopotine, Arun V. Sathanur, and Vikram Jandhyala</i>	

Session 2: Applications and Algorithms Using Hardware Accelerators

GPU-Accelerated High-Speed Eye Pupil Tracking System	17
<i>Juan Mompeán, Juan L. Aragón, Pedro Prieto, and Pablo Artal</i>	
Efficient Irregular Wavefront Propagation Algorithms on Intel(R) Xeon Phi(TM)	25
<i>Jeremias M. Gomes, George Teodoro, Alba de Melo, Jun Kong, Tahsin Kurc, and Joel H. Saltz</i>	

Session 3: New Architectures and Hardware Mechanisms to Improve Performance

Performance and Energy Efficient Hardware-Based Scheduler for Symmetric/Asymmetric CMPs	33
<i>Nikola Markovic, Daniel Nemirosky, Osman S. Unsal, Marteo Valero, and Adrian Cristal</i>	
Analysis and Optimization of Engines for Dynamically Typed Languages	41
<i>Gem Dot, Alejandro Martínez, and Antonio González</i>	
Memory Centric Computation (Mc2) for Large-Scale Graph Processing	49
<i>Kattamuri Ekanadham and Guojing Cong</i>	
Progressive Codesign of an Architecture and Compiler Using a Proxy Application	57
<i>Arpit Jacob, Ravi Nair, Tong Chen, Zehra Sura, Changhoan Kim, Carlo Bertolli, Samuel Antao, and Kevin O'Brien</i>	

Session 4: Memory Systems and Optimizations

Tidy Cache: Improving Data Placement in Die-Stacked DRAM Caches	65
<i>Adrià Armejach, Adrián Cristal, and Osman S. Unsal</i>	
Unifying Router Power Gating with Data Placement for Energy-Efficient NoC	74
<i>Yuho Jin</i>	
i-MIRROR: A Software Managed Die-Stacked DRAM-Based Memory Subsystem	82
<i>Jee Ho Ryoo, Karthik Ganesan, Yao-Min Chen, and Lizy Kurian John</i>	

Session 5: Code Optimization

Fusion of Calling Sites	90
<i>Douglas do Couto Teixeira, Sylvain Collange, and Fernando Magno Quintão Pereira</i>	
OpenCL Kernel Fusion for GPU, Xeon Phi and CPU	98
<i>Jiří Filipovič and Siegfried Benkner</i>	

Session 6: System Characterization and Performance Evaluation

Watt Watcher: Fine-Grained Power Estimation for Emerging Workloads	106
<i>Michael LeBeane, Jee Ho Ryoo, Reena Panda, and Lizy Kurian John</i>	
Performance Characterization of Modern Databases on Out-of-Order CPUs	114
<i>Reena Panda, Christopher Erb, Michael LeBeane, Jee Ho Ryoo, and Lizy Kurian John</i>	

Cloud Services Evaluation through QoE: A Methodological Approach	122
<i>Frederico G.I. da Costa, M. Cristina F. de Castro, Candice Muller, and Fernando C.C. de Castro</i>	
Non-stationary Simulation of Computer Systems and Dynamic Performance	
Evaluation: A Concern-Based Approach and Case Study on Cloud Computing	130
<i>Lourenço A. Pereira Jr., Edwin L.C. Mamani, Marcos J. Santana, Regina H.C. Santana, Pedro Northon Nobile, and Francisco José Monaco</i>	
Serialization Management for Best-Effort Hardware Transactional Memory	138
<i>Matthew Gaudet, Guido Araújo, and José Nelson Amaral</i>	

Session 7: Fault Tolerance and Cloud Storage

Exploring Energy-Consistency Trade-Offs in Cassandra Cloud Storage System	146
<i>Houssein-Eddine Chihoub, Shadi Ibrahim, Yue Li, Gabriel Antoniu, María S. Pérez, and Luc Bougé</i>	
COMET: Client-Oriented METadata Service for Highly Available Distributed File Systems	154
<i>Ruini Xue, Lixiang Ao, and Zhongyang Guan</i>	
A Fault-Tolerance Protocol for Parallel Applications with Communication Imbalance	162
<i>Esteban Meneses and Laxmikant V. Kalé</i>	

Session 8: Scheduling and Virtual Machines

Comparison of Static and Runtime Resource Allocation Strategies for Matrix Multiplication	170
<i>Olivier Beaumont, Lionel Eyraud-Dubois, Abdou Guermouche, and Thomas Lambert</i>	
Device-Sensitive Framework for Handling Heterogeneous Asymmetric Clusters Efficiently	178
<i>Valon Raca and Eduard Mehofer</i>	

Session 9: Scheduling and Virtual Machines

Evaluating the Impact of Memory Allocation and Swap for Vertical Memory Elasticity in VMs	186
<i>Roberto Sawamura, Cristina Boeres, and Vinod E.F. Rebello</i>	
Quantum Virtual Machine: A Scalable Model to Optimize Energy Savings and Resource Management	194
<i>André Felipe Monteiro and Orlando Loques</i>	

A Programming Interface for Overload Control in Staged Event-Based Architectures	202
<i>Breno Riba, Noemi Rodriguez, and Ana Lúcia de Moura</i>	
Author Index	209