

**2010 IEEE International  
Symposium on Performance  
Analysis of Systems & Software  
(ISPASS 2010)**

**White Plains, New York, USA  
28 – 30 March 2010**



**IEEE Catalog Number: CFP10PER-PRT  
ISBN: 978-1-4244-6023-6**

## Table of Contents

# 2010 IEEE International Symposium on Performance Analysis of Systems and Software ISPASS 2010

Message from the General Chair .....	iii
Message from the Program Chair.....	iv
Organization and Program Committees .....	v
Reviewers .....	vi

### Keynote I

<b>The Big Pileup</b> .....	1
<i>Nick Mitchell</i> <i>(IBM)</i>	

### Session 1: Interactive Workloads

<b>Dynamic Program Analysis of Microsoft Windows Applications</b> .....	2
<i>Alex Skaletsky, Tevi Devor, Nadav Chachmon, Robert Cohn, Kim Hazelwood*, Vladimir Vladimirov, Moshe Bach</i> <i>(Intel Corporation, University of Virginia*)</i>	
<b>LagAlyzer: A latency profile analysis and visualization tool</b> .....	13
<i>Andrea Adamoli, Milan Jovic, Matthias Hauswirth</i> <i>(University of Lugano)</i>	
<b>Characterizing the Design and Performance of Interactive Java Applications</b> .....	23
<i>Dmitrijs Zaparanuks, Matthias Hauswirth</i> <i>(University of Lugano)</i>	

### Session 2: Performance Modeling Methodologies

<b>Synthesizing Memory-Level Parallelism Aware Miniature Clones for SPEC CPU2006 and ImplantBench Workloads</b> .....	33
<i>Karthik Ganesan, Jung-ho Jo, Lizy K John</i> <i>(University of Texas at Austin)</i>	
<b>ArchExplorer.org: A Methodology for Facilitating a Fair Comparison of Research Ideas</b> .....	45
<i>Veerle Desmet, Sylvain Girbal *, Olivier Temam **</i> <i>(Ghent University, Thales Research *, INRIA Saclay**)</i>	
<b>Statstack: Efficient Modeling of LRU caches</b> .....	55
<i>David Eklov, Erik Hagersten</i> <i>(Uppsala University)</i>	

### Session 3: Memory in Multicores

**Modeling Memory Concurrency for Multi-Socket Multi-Core Systems .....66**

*Anirban Mandal, Rob Fowler, Allan Porterfield  
(Renaissance Computing Institute, UNC-Chapel Hill)*

**Cache Contention and Application Performance Prediction for Multi-Core Systems .....76**

*Chi Xu\*, Xi Chen, Robert Dick, Zhuoqing Morley Mao  
(\*University of Minnesota, University of Michigan)*

**Memphis: Finding and Fixing NUMA-related Performance Problems on Multi-core Platforms .....87**

*Collin McCurdy, Jeffrey Vetter  
(Oak Ridge National Laboratory)*

**Understanding Transactional Memory Performance .....97**

*Donald E Porter, Emmett Witchel  
(The University of Texas at Austin)*

### Poster Session

**Influences of SIMD Architectures for Scattered Data Interpolation Algorithm .....109**

*Jean-Charles Tournier, Martin Naef  
(ABB Inc.)*

**Hardware Prediction of OS Run-Length For Fine-Grained Resource Customization .....111**

*David Nellans, Kshitij Sudan, Rajeev Balasubramonian, Erik Brunvand  
(University of Utah)*

**Program Behavior Characterization in Large Memory Systems.....113**

*Parijat Dube, Michael Tsao, Dan Poff, Li Zhang, Alan Bivens  
(IBM)*

**Simulation Environment for Studying Overlap of Communication and Computation .....115**

*Vladimir Subotic\*, Jesus Labarta \*, \*\*, Mateo Valero \*, \*\*  
(\*Barcelona Supercomputing Center, \*\*Universitat Politecnica de Catalunya)*

**Scalability Comparison of Commodity Operating Systems on Large Scale Multi-Cores.....117**

*Yan Cui, Yu Chen, Yuanchun Shi, Qingbo Wu\*  
(Tsinghua, \*National University of Defense Technology)*

**Incorporating Instruction-Based Sampling into AMD CodeAnalyst and OProfile.....119**

*Paul Drongowski, Lei Yu, Frank Swehosky, Suravee Suthikulpanit, Robert Richter  
(Advanced Micro Devices)*

### Keynote II:

**Using Special-Purpose Hardware to Achieve a Hundred-Fold Speedup in Molecular Dynamics Simulations of Proteins .....121**

*David Shaw  
(D. E. Shaw Research and Center for Computational Biology and Bioinformatics, Columbia University)*

## Session 4: Performance Analysis in Servers and Datacenters

**The Hadoop Distributed Filesystem: Balancing Portability and Performance .....122**

*Jeffrey Shafer, Scott Rixner, Alan L. Cox  
(Rice University)*

**Scaling OLTP Applications on Commodity Multi-Core Platforms .....134**

*Yan Cui, Yu Chen, Yuanchun Shi  
(Tsinghua University)*

**A Study of Hardware Assisted IP over InfiniBand and its Impact on Enterprise Data Center Performance.....144**

*Ryan E Grant , Pavan Balaji \*, Ahmad Afsahi  
(Queen's University, Argonne National Laboratory\*)*

**Weak Execution Ordering - Exploiting Iterative Methods on Many-Core GPUs .....154**

*Jianmin Chen, Zhuo Huang, Feiqi Su, Jih-Kwon Peir, Jeff Ho, Lu Peng\*  
(University of Florida, Louisiana State University\*)*

## Session 5: Tools

**Visualizing Complex Dynamics in Many-Core Accelerator Architectures .....164**

*Aaron Ariel, Wilson W. L. Fung, Andrew E. Turner, Tor M. Aamodt  
(University of British Columbia)*

**PEBIL: Efficient Static Binary Instrumentation for Linux.....175**

*Michael A. Laurenzano, Mustafa M. Tikir, Laura Carrington, Allan Snively  
(San Diego Supercomputer Center)*

**High-Level Performance Modeling of Task-Based Algorithms: A Blueprint for Understanding the Performance of TBB Algorithms .....184**

*Alexei Alexandrov, Douglas Armstrong, Donald Hayes, Hrabri Rajic, Michael Voss  
(Intel)*

**Exploiting FPGAs for Technology-Aware System-Level Evaluation of Multi-Core Architectures...194**

*Paolo Meloni, Simone Secchi, Luigi Raffo  
(University of Cagliari – DIEE)*

## Session 6: Microarchitecture Analysis

**Runahead Execution vs. Conventional Data Prefetching in the IBM POWER6 Microprocessor .....203**

*Harold W. Cain, Priya Nagpurkar  
(IBM Research)*

**An Analysis of Hard to Predict Branches.....213**

*Celal Ozturk, Resit Sendag  
(University of Rhode Island)*

**Performance-Effective Operation below Vcc-min.....223**

*Nikolas Ladas, Yiannakis Sazeides, Veerle Desmet\*  
(University of Cyprus, Ghent University\*)*

**Demystifying GPU Microarchitecture through Microbenchmarking .....235**

*Henry Wong, Misel-Myrto Papadopoulou, Maryam Sadooghi-Alvandi, Andreas Moshovos  
(University of Toronto)*

**Cwj qt 'Kpf gz**