

2018 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2018)

**Belfast, United Kingdom
2 – 4 April 2018**



**IEEE Catalog Number: CFP18PER-POD
ISBN: 978-1-5386-5011-0**

**Copyright © 2018 by the Institute of Electrical and Electronics 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18PER-POD
ISBN (Print-On-Demand):	978-1-5386-5011-0
ISBN (Online):	978-1-5386-5010-3

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

CURRAN ASSOCIATES INC.
proceedings
.com

2018 IEEE International Symposium on Performance Analysis of Systems and Software **ISPASS 2018**

Table of Contents

Welcome from the General Chairs	ix
Welcome from the Program Chair	x
ISPASS Committees	xi
Program Committee	xiii

Paper Session I: Best Paper Nominees

Behind the Scenes: Memory Analysis of Graphical Workloads on Tile-Based GPUs	1
<i>German Ceballos (Uppsala University), Andreas Sembrant (Uppsala University), Trevor E. Carlson (National University of Singapore), and David Black-Schaffer (Uppsala University)</i>	
Performance Analysis of NVMe SSD-Based All-flash Array Systems	12
<i>Young Tack Jin (Circuit Blvd.), Sungjoon Ahn (Circuit Blvd.), and Sungjin Lee (DGIST)</i>	
Doppio: I/O-Aware Performance Analysis, Modeling and Optimization for In-memory Computing Framework	22
<i>Peipei Zhou (University of California), Zhenyuan Ruan (University of California), Zhenman Fang (University of California), Megan Shand (Broad Institute), David Roazen (Broad Institute), and Jason Cong (University of California)</i>	
MAPS: Understanding Metadata Access Patterns in Secure Memory	33
<i>Tamara Silbergleit Lehman (Duke University), Andrew D. Hilton (Duke University), and Benjamin C. Lee (Duke University)</i>	

Paper Session II: Energy and Power

Hardware-Validated CPU Performance and Energy Modelling	44
<i>Matthew Walker (University of Southampton), Sascha Bischoff (Arm Ltd), Stephan Diestelhorst (Arm Ltd), Geoff Merrett (University of Southampton), and Bashir Al-Hashimi (University of Southampton)</i>	

Micro-Viruses for Fast System-Level Voltage Margins Characterization in Multicore CPUs .54.....	
<i>George Papadimitriou (University of Athens), Athanasios Chatzidimitriou (University of Athens), Manolis Kaliorakis (University of Athens), Yannis Vastakis (University of Athens), and Dimitris Gizopoulos (University of Athens)</i>	
DORA: Optimizing Smartphone Energy Efficiency and Web Browser Performance under Interference .64.....	
<i>Davesh Shingari (Arizona State University), Akhil Arunkumar (Arizona State University), Benjamin Gaudette (Arizona State University), Sarma Vrudhula (Arizona State University), and Carole-Jean Wu (Arizona State University)</i>	

Paper Session III: Data Centers and Interconnects

Proctor: Detecting and Investigating Interference in Shared Datacenters .76.....	
<i>Ram Srivatsa Kannan (University of Michigan), Animesh Jain (University of Michigan), Michael A. Laurenzano (University of Michigan), Lingjia Tang (University of Michigan), and Jason Mars (University of Michigan)</i>	
SuperSim: Extensible Flit-Level Simulation of Large-Scale Interconnection Networks .87.....	
<i>Nic McDonald (Hewlett Packard Enterprise), Adriana Flores (Hewlett Packard Enterprise), Al Davis (Hewlett Packard Enterprise), Mikhail Isaev (Georgia Institute of Technology), John Kim (Korea Advanced Institute of Science and Technology), and Doug Gibson (Hewlett Packard Enterprise)</i>	
Performance Implications of NoCs on 3D-Stacked Memories: Insights from the Hybrid Memory Cube .99.....	
<i>Ramyad Hadidi (Georgia Institute of Technology), Bahar Asgari (Georgia Institute of Technology), Jeffrey Young (Georgia Institute of Technology), Burhan Ahmad Mudassar (Georgia Institute of Technology), Kartikay Garg (Georgia Institute of Technology), Tushar Krishna (Georgia Institute of Technology), and Hyesoon Kim (Georgia Institute of Technology)</i>	

Poster Session

Characterizing the Runtime Effects of Object-Oriented Workloads on GPUs .109.....	
<i>Mengchi Zhang (Purdue University), Roland Green (Purdue University), and Timothy G. Rogers (Purdue University)</i>	
PowerSensor 2: A Fast Power Measurement Tool .111.....	
<i>John W. Romein (ASTRON (Netherlands Institute for Radio Astronomy)) and Bram Veenboer (ASTRON (Netherlands Institute for Radio Astronomy))</i>	
HMCSP: Reducing Transaction Latency of CSR-based SPMV in Hybrid Memory Cube .114.....	
<i>Cheng Qian (National University of Defense Technology), Bruce Childers (University of Pittsburgh), Libo Huang (National University of Defense Technology), Qi Yu (National University of Defense Technology), and Zhiying Wang (National University of Defense Technology)</i>	

Evaluating Memory Performance of Emerging Scale-Out Applications Using C-AMAT .117.....	<i>Qi Yu (National University of Defense Technology), Libo Huang (National University of Defense Technology), Cheng Qian (National University of Defense Technology), Jianqiao Ma (National University of Defense Technology), and Zhiying Wang (National University of Defense Technology)</i>
Shifting the Barrier: Extending the Boundaries of the BarrierPoint Methodology .120.....	<i>Miguel Tairum Cruz (Arm Ltd.), Sascha Bischoff (Arm Ltd.), and Roxana Rusitoru (Arm Ltd.)</i>
Algorithmic Performance-Accuracy Trade-off in 3D Vision Applications .123.....	<i>Bruno Bodin (University of Edinburgh), Luigi Nardi (Stanford University), Harry Wagstaff (University of Edinburgh), Paul H J Kelly (Imperial College London), and Michael O'Boyle (University of Edinburgh)</i>
Impact of System Resources on Performance of Deep Neural Network .125.....	<i>Parijat Dube (IBM) and Zehra Sura (IBM)</i>

Paper Session IV: Emerging Workloads and Benchmarks

Understanding the Characteristics of Mobile Augmented Reality Applications .128.....	<i>Huixiang Chen (University of Florida), Yuting Dai (Guizhou University), Hao Meng (University of Florida), Yilun Chen (Purdue University), and Tao Li (University of Florida)</i>
Performance Characterisation and Simulation of Intel's Integrated GPU Architecture .139.....	<i>Prasun Gera (Georgia Institute of Technology), Hyojong Kim (Georgia Institute of Technology), Hyesoon Kim (Georgia Institute of Technology), Sunpyo Hong (Intel Corporation), Vinod George (Intel Corporation), and Chi-Keung (CK) Luk (Intel Corporation)</i>
A Workload Characterization of the SPEC CPU2017 Benchmark Suite .149.....	<i>Ankur Limaye (University of Arizona) and Tosiron Adegbiya (University of Arizona)</i>
The Alberta Workloads for the SPEC CPU 2017 Benchmark Suite .159.....	<i>Jose Nelson Amaral (University of Alberta), Edson Borin (Universidade de Campinas), Dylan R. Ashley (University of Alberta), Caian Benedicto (Universidade de Campinas), Elliot Colp (Bioware), Joao Henrique Stange Hoffmam (Universidade de Campinas), Marcus Karpoff (University of Alberta), Erick Ochoa (University of Alberta), Morgan Redshaw (DeepMind), and Raphael Ernani Rodrigues (Microsoft)</i>

Paper Session V: Performance Analysis Method

Towards Cross-Framework Workload Analysis via Flexible Event-Driven Interfaces .169.....	<i>Michael Lui (Drexel University), Karthik Sangaiah (Drexel University), Mark Hempstead (Tufts University), and Baris Taskin (Drexel University)</i>
--	---

Extending the Performance Analysis Tool Box: Multi-stage CPI Stacks and FLOPS Stacks .179.....	
<i>Stijn Eyerma (Intel Corporation), Wim Heirman (Intel Corporation),</i>	
<i>Kristof Du Bois (Intel Corporation), and Ibrahim Hur (Intel Corporation)</i>	
Low-Overhead Dynamic Instruction Mix Generation Using Hybrid Basic Block Profiling .189.....	
<i>Andrzej Nowak (CERN openlab and EPFL), Pawel Szostek (Criteo), Ahmad</i>	
<i>Yasin (Intel Corporation), and Willy Zwaenepoel (EPFL)</i>	

Paper Session VI: GPU Performance

Performance Characterization of Multi-threaded Graph Processing Applications on Many-Integrated-Core Architecture .199.....	
<i>Lei Jiang (Indiana University Bloomington), Langshi Chen (Indiana University Bloomington), and Judy Qiu (Indiana University Bloomington)</i>	
Evaluating Performance Tradeoffs on the Radeon Open Compute Platform .209.....	
<i>Yifan Sun (Northeastern University), Saoni Mukherjee (Northeastern University), Trinayan Baruah (Northeastern University), Shi Dong (Northeastern University), Julian Gutierrez (Northeastern University), Prannoy Mohan (Northeastern University), and David Kaeli (Northeastern University)</i>	
A Cross-platform Evaluation of Graphics Shader Compiler Optimization .219.....	
<i>Lewis Crawford (The University of Edinburgh) and Michael O'Boyle (The University of Edinburgh)</i>	
Characterizing a Commercial Multidimensional Heterogeneous Processor Under GPGPU Workloads .229.....	
<i>Matthew A. Watkins (Lafayette College) and Philip Bedoukian (Lafayette College)</i>	
Author Index 241.	