

# **Proceedings of the 2013 IEEE/ACM International Symposium on Code Generation and Optimization**

## **(CGO 2013)**

**Shenzhen, China  
23 – 27 February 2013**



**IEEE Catalog Number: CFP13CGO-PRT  
ISBN: 978-1-4673-5524-7**

# Table of Content

<b>SESSION 1: Optimization</b>	(Session Chair: Frank Mueller )
<b>Query-Directed Adaptive Heap Cloning For Optimizing Compilers.....</b>	<b>1-11</b>
<i>Yulei Sui, Yue Li, and Jingling Xue (UNSW)</i>	
<b>Lightweight Fault Detection in Parallelized Programs.....</b>	<b>12-22</b>
<i>Li Tan (University of California, Riverside), Min Feng (NEC Laboratories America), and Rajiv Gupta (University of California, Riverside)</i>	
<b>AccelDroid: Co-designed Acceleration of Android Bytecode.....</b>	<b>23-32</b>
<i>Cheng Wang, Youfeng Wu, and Marcelo Cintra (Intel Labs)</i>	
<b>Experiences in Designing a Robust and Scalable Interpreter Profiling Framework.....</b>	<b>33-42</b>
<i>Ian Gartley, Marius Pirvu, Vijay Sundaresan, and Nikola Grcevski (IBM Canada)</i>	
<b>SESSION 2: Profiling</b>	(Session Chair: Harish Patil )
<b>Instant Profiling: Instrumentation Sampling for Profiling Datacenter Applications.....</b>	<b>43-52</b>
<i>Hyoun Kyu Cho (University of Michigan), Tipp Moseley, Richard Hank, and Derek Bruening (Google), and Scott Mahlke (University of Michigan)</i>	
<b>Pertinent Path Profiling: Tracking Interactions Among Relevant Statements.....</b>	<b>53-64</b>
<i>Ramshankar Chouhan, Subhajit Roy, and Surender Baswana (IIT Kanpur)</i>	
<b>ProfMig: A Framework for Flexible Migration of Program Profiles Across Software Versions.....</b>	<b>65-76</b>
<i>Mingzhou Zhou, Bo Wu, Yufei Ding, and Xipeng Shen (The College of William and Mary)</i>	
<b>Session 3: Program Analysis</b>	(Session Chair: Erik Altman)
<b>Skadu: Efficient Vector Shadow Memories for Poly-Scopic Program Analysis.....</b>	<b>77-88</b>
<i>Donghwan Jeon (Google), Saturnino Garcia (University of San Diego), and Michael Taylor (University of California, San Diego)</i>	
<b>Performance Upper Bound Analysis and Optimization of SGEMM on Fermi and Kepler GPUs.....</b>	<b>89-98</b>
<i>Junjie Lai and Andre Seznec (INRIA, France)</i>	
<b>Bandwidth Bandit: Quantitative Characterization of Memory Contention.....</b>	<b>99-108</b>
<i>David Eklov, Nikos Nikoleris, David Black-Schaffer, and Erik Hagersten (Uppsala University)</i>	
<b>Effective Fault Localization Based on Minimum Debugging Frontier Set.....</b>	<b>109-118</b>
<i>Feng Li, Wei Huo, Congming Chen, Lujie Zhong, and Xiaobing Feng (Institute of Computing Technology,</i>	

Chinese Academy of Sciences) and Zhiyuan Li (Purdue University)

**Session 4: Parallelism I** (Session Chair: Lieven Eeckhout)

**SIMD Parallelization of Applications that Traverse Irregular Data Structures.....119-128**

Bin Ren and Gagan Agrawal (The Ohio State University), Jim Larus (Microsoft Research), Todd Mytkowicz (RiSE/Microsoft Research), Tomi Poutanen (Microsoft), and Wolfram Schulte (RiSE/Microsoft Research)

**Practical Lock/Unlock Pairing for Concurrent Programs.....129-140**

Hyoun Kyu Cho (University of Michigan), Yin Wang (Hewlett-Packard Labs), Hongwei Liao (University of Michigan), Terence Kelly (Hewlett-Packard Labs), and Stephane Lafontaine and Scott Mahlke (University of Michigan)

**vLock: Lock Virtualization Mechanism for Exploiting Fine-grained Parallelism in Graph Traversal Algorithms.....141-150**

Jie Yan, Guangming Tan, Xiuxia Zhang, Erlin Yao and Ninghui Sun (ICT,CAS)

**Session 5: Data Parallelism** (Session Chair: Jingling Xue )

**Runtime Dependence Computation and Execution of Loops on Heterogeneous Systems.....151-160**

Jayvant Anantpur and R. Govindarajan (Indian Institute of Science)

**Portable Mapping of Data Parallel Programs to OpenCL for Heterogeneous Systems.....161-170**

Dominik Grewe, Zheng Wang, and Michael F.P. O'Boyle (University of Edinburgh)

**HiDP: A Hierarchical Data Parallel Language.....171-181**

Yongpeng Zhang and Frank Mueller (North Carolina State University)

**Convergence and Scalarization for Data-Parallel Architectures.....182-192**

Yunsup Lee (UC Berkeley), Ronny Krashinsky, Vinod Grover, and Stephen W. Keckler (NVIDIA), and Krste Asanovic (UC Berkeley)

**Session 6: Security** (Session Chair: Satish Narayanasamy )

**A Fast and Low-Overhead Technique to Secure Programs Against Integer Overflows.....193-203**

Raphael Ernani Rodrigues, Victor Hugo Sperle Campos, and Fernando Magno Quintao Pereira (UFMG)

**Profile-guided Automated Software Diversity.....204-214**

Andrei Homescu, Steven Neisius, Per Larsen, Stefan Brunthaler, and Michael Franz (University of California Irvine)

**Schnauzer: Scalable Profiling for Likely Security Bug Sites.....215-225**

William Arthur, Biruk Mammo, Ricardo Rodriguez, Todd Austin, and Valeria Bertacco (University of Michigan - Ann Arbor)

**Session 7: Parallelism II** (Session Chair: Kathryn S. McKinley)

**Hydra: Automatic Algorithm Exploration from Linear Algebra Equations.....226-235**

Alexandre Duchateau and David Padua (UIUC) and Denis Barthou (Universite de Bordeaux)

**On the Platform Specificity of STM Instrumentation Mechanisms.....236-245**

Wenjia Ruan, Yujie Liu, Chao Wang, and Michael Spear (Lehigh University)

**Automatically Exploiting Cross-Invocation Parallelism Using Runtime Information.....246-256**

Jialu Huang, Thomas B. Jablin, Stephen Beard, Nick P. Johnson, and David I. August (Princeton University)

**Session 8: Code Generation** (Session Chair: Jason Mars )

**Idempotent Code Generation: Implementation, Analysis, and Evaluation.....257-268**

Marc de Kruijf (Google) and Karthikeyan Sankaralingam (University of Wisconsin - Madison)

**Improving Data Access Efficiency by Using a Tagless Access Buffer (TAB).....269-279**

Alen Bardizbanyan (Chalmers University of Technology), Peter Gavin, David Whalley, and Magnus Sjlander (Florida State University), and Per Larsson-Edefors, Sally McKee, and Per Stenstrom (Chalmers University of Technology)

**Automatic Construction of Inlining Heuristics using Machine Learning.....280-291**

Sameer Kulkarni and John Cavazos (University of Delaware) and Christian Wimmer and Douglas Simon (Oracle Inc.)

**A Polynomial Spilling Heuristic: Layered Allocation.....292-301**

Boubacar Diouf (INRIA), Albert Cohen (INRIA and ENS de Paris), and Fabrice Rastello (INRIA and ENS de Lyon)

**Session 9: Dynamic Languages** (Session Chair: Ben Zorn )

**Just-in-Time Value Specialization.....302-312**

Igor Rafael de Assis Costa, Pericles Rafael Oliveira Alves, Henrique Nazare Santos, and Fernando Magno Quintao Pereira (UFMG)

**JSWhiz - Static Analysis for JavaScript Memory Leaks.....313-323**

Jacques Piennar (Purdue University) and Robert Hundt (Google)

**Session 10: Multi-Core Mapping** (Session Chair: Chengyong Wu )

**Defensive Loop Tiling for Shared Cache.....324-334**

Bin Bao and Chen Ding (University of Rochester)

**Locality-Aware Mapping and Scheduling for Multicores.....335-346**

Wei Ding, Yuanrui Zhang, Mahmut Kandemir, Jithendra Srinivas, and Praveen Yedlapalli (Penn State)

**Smart, Adaptive Mapping of Parallelism in the Presence of External Workload.....347-356**

Murali Emani, Zheng Wang, and Michael F.P. O'Boyle (University of Edinburgh)

**Author Index .....**.....**357-359**