2009 International Symposium on Code Generation and Optimization

CGO 2009

Table of Contents

Message from the General Co-chairs
Message from the Program Chair
Organizing Committee
Program Committee
Additional Reviewers
Sponsors

WORKSHOPS

Fourth Workshop on Software Tools for MultiCore Systems (STMCS 2009)
Chair: Rodric Rabbah (IBM Research)

Open64 Workshop
Chair: Guang R. Gao (University of Delaware)

Seventh Workshop on Optimizations for DSP and Embedded Systems (ODES 2009)
Co-chairs: Jagadeesh Sankaran (Texas Instruments) and Tom Vander Aa (IMEC)

Exploiting Parallelism Using GPUs and Other Hardware-Assisted Methods (EPHAM 2009)
Co-chairs: Vinod Grover (NVIDIA Corporation) and Richard Johnson (NVIDIA Corporation)

Workshop on Infrastructures for Software/Hardware Co-design (WISH 2009)
Chair: Uma Srinivasan (Intel)

TUTORIALS

Tutorial on SSA-Based Register Allocation
Organizers: Philip Brisk (EPFL), Jens Palsberg (UCLA), Alain Darte (INRIA) and Fabrice Rastello (INRIA)

Intel® Threading Building Blocks: Programming for Current and Future Multicore Platforms
Organizer: Michael Voss (Intel)

Tutorial on Software Transactional Memory
Organizers: Yang Ni (Intel) and Adam Welc (Intel)

KEYNOTES

An Evolution of General Purpose Processing: Reconfigurable Logic Computing
Keynote Speaker: Joel Emer (Intel)

The Next Generation of Compilers
Keynote Speaker: Vikram Adve (UIUC)

Optimization for Concurrency

Communication-Sensitive Static Dataflow for Parallel Message Passing Applications .................................................1
Greg Bronevetsky (Lawrence Livermore National Laboratory)
Reducing Memory Ordering Overheads in Software Transactional Memory ........................................................... 13
   Michael F. Spear (University of Rochester), Maged M. Michael (IBM), Michael L. Scott (University of Rochester) and Peng Wu (IBM)

Detecting and Eliminating Potential Violations of Sequential Consistency for Concurrent C/C++ Programs ................................................................................................................ .........................................25
   Yuelu Duan (Chinese Academy of Sciences), Xiaobing Feng (Chinese Academy of Sciences), Lei Wang (Chinese Academy of Sciences), Chao Zhang (Chinese Academy of Sciences) and Pen-Chung Yew (University of Minnesota at Twin-Cities)

ESoftCheck: Removal of Non-vital Checks for Fault Tolerance..........................................................................................35
   Jing Yu (Google), Maria Jesus Garzaran (University of Illinois, Urbana-Champaign) and Marc Snir (University of Illinois, Urbana-Champaign)

Profile-Directed Optimization

Alchemist: A Transparent Dependence Distance Profiling Infrastructure........................................................................47
   Xiangyu Zhang (Purdue University), Armand Navabi (Purdue University) and Suresh Jagannathan (Purdue University)

Workload Reduction for Multi-input Feedback-Directed Optimization........................................................................59
   Paul Berube (University of Alberta), Jose Nelson Amaral (University of Alberta), Rayson Ho (IBM) and Raul Silvera (IBM)

Profiling k-Iteration Paths: A Generalization of the Ball-Larus Profiling Algorithm .........................................................70
   Subhajit Roy (Indian Institute of Science) and Y.N. Srikant (Indian Institute of Science)

Intelligence in Optimization

Automatic Feature Generation for Machine Learning Based Optimizing Compilation ..................................................81
   Hugh Leather (University of Edinburgh), Edwin Bonilla (University of Edinburgh) and Michael O’Boyle (University of Edinburgh)

Cross-Input Learning and Discriminative Prediction in Evolvable Virtual Machines .....................................................92
   Feng Mao (College of William and Mary) and Xipeng Shen (College of William and Mary)

Computer Generation of General Size Linear Transform Libraries ..............................................................................102
   Yevgen Voronenko (Carnegie Mellon University), Frédéric de Mesmay (Carnegie Mellon University) and Markus Püschel (Carnegie Mellon University)

Program Analysis and Optimization

Revisiting Out-of-SSA Translation for Correctness, Code Quality and Efficiency .........................................................114
   Benoit Boissinot (INRIA), Alain Darte (INRIA), Fabrice Rastello (INRIA), Benoit Dupont de Dinechin (STMicroelectronics) and Christophe Guillon (STMicroelectronics)

Wave Propagation and Deep Propagation for Pointer Analysis ..................................................................................126
   Fernando Magno Quintao Pereira (UCLA) and Daniel Berlin (Google)

A Fast and Precise Static Loop Analysis Based on Abstract Interpretation, Program Slicing and Polytope Models ..................................................................................................................136
   Daniel Cordes (Embedded Systems Group), Heiko Falk (Embedded Systems Group) and Peter Marwedel (Embedded Systems Group)
Techniques for Region-Based Register Allocation

Ivan D. Baev (Hewlett-Packard)

Dynamic Optimization

Fast Track: A Software System for Speculative Program Optimization

Kirk Kelsey (University of Rochester), Tongxin Bai (University of Rochester), Chen Ding (University of Rochester) and Chengliang Zhang (Microsoft)

Scenario Based Optimization: A Framework for Statically Enabling Online Optimizations

Jason Mars (University of Virginia) and Robert Hundt (Google)

An Evaluation of Misaligned Data Access Handling Mechanisms in Dynamic Binary Translation Systems

Jianjun Li (Chinese Academy of Sciences), Chenggang Wu (Chinese Academy of Sciences) and Wei-Chung Hsu (University of Minnesota)

A Practical Approach to Hardware Performance Monitoring Based Dynamic Optimizations in a Production JVM

John Cuthbertson (Intel), Sandhya Viswanathan (Intel), Konstantin Bobrovsky (Intel), Alexander Astapchuk (Intel), Eric Kaczmarek (Intel) and Uma Srinivasan (Intel)

Optimizing Stream Programs

Software Pipelined Execution of Stream Programs on GPUs

Abhishek Udupa (Indian Institute of Science), R. Govindarajan (Indian Institute of Science) and Matthew J. Thazhuthaveetil (Indian Institute of Science)

Stream Compilation for Real-Time Embedded Multicore Systems

Yoonseo Choi (University of Michigan), Yuan Lin (University of Michigan), Nathan Chong (Cambridge), Scott Mahlke (University of Michigan) and Trevor Mudge (University of Michigan)

Representing Calling Contexts

Building Approximate Calling Context from Partial Call Traces

Mauricio Serrano (IBM) and Xiaotong Zhuang (IBM)

Two-Level Dictionary Code Compression: A New Scheme to Improve Instruction Code Density of Embedded Applications

Mikael Collin (Royal Institute of Technology) and Mats Brorsson (Royal Institute of Technology)

Procedural Abstraction with Reverse Prefix Trees

Stefan Schaeckeler (Santa Clara University) and Weijia Shang (Santa Clara University)

Tools

OptiScope: Performance Accountability for Optimizing Compilers

Tipp Moseley (University of Colorado), Dirk Grunwald (University of Colorado) and Ramesh Peri (Intel)

Perflint: A Context Sensitive Performance Advisor for C++ Programs

Lixia Liu (Purdue University) and Silvius Rus (Google)

Transparent Debugging of Dynamically Optimized Code

Naveen Kumar (University of Pittsburgh), Bruce R. Childers (University of Pittsburgh) and Mary Lou Soffa (University of Virginia)

Author Index