Publications

2018


2017


2016

- **Fine-grained parallelism in probabilistic parsing with Habanero Java.** Matthew Francis-Landau (Johns Hopkins University), Bing Xue (Rice University), Jason Eisner (Johns Hopkins University) and Vivek Sarkar (Rice University). In Proceedings of the Sixth Workshop on Irregular Applications: Architectures and Algorithms (IA3, co-located with SC16), November 2016 [slides].

- **Exploring Compiler Optimization Opportunities for the OpenMP 4.x Accelerator Model on a POWER8+GPU Platform.** Akio Hayashi, Jun Shirako, Ettore Tiotto, Robert Ho, Vivek Sarkar. Third Workshop on Accelerator Programming Using Directives (WACCPD, co-located with SC16), November 2016.

- **Optimized Distributed Work-Stealing.** Vivek Kumar, Karthik Murthy, Vivek Sarkar and Yili Zheng. 6th workshop on Irregular Applications: Architectures and Algorithms (IA^3'16), ACM, November 2016 [slides].


- **An Extended Polyhedral Model for SPMD Programs and its use in Static Data Race Detection.** Prasanth Chatarasi, Jun Shirako, Martin Kong, Vivek Sarkar. The 29th International Workshop on Languages and Compilers for Parallel Computing (LCPC), September 2016 [slides].


- **Dynamic Determinacy Race Detection for Task Parallelism with Futures.** Rishi Surendran and Vivek Sarkar. 16th International Conference on Runtime Verification (RV'16), September 2016.

- **Declarative Tuning for Locality in Parallel Programs.** Sanjay Chatterjee, Nick Vrviso, Zoran Budimlic, Kathleen Knobe, Vivek Sarkar. The 45th International Conference on Parallel Processing (ICPP-2016), August 2016. (slides)


- **A Distributed Selectors Runtime System for Java Applications.** Arghya Chatterjee, Branko Gvoka, Bing Xue, Zoran Budimlic, Shams Imam, Vivek Sarkar. 13th International Conference on the Principles and Practice of Programming on the Java Platform: virtual machines, languages, and tools (PPPJ'16), August 2016 [slides].

- **Design and verification of distributed phasers.** Karthik Murthy, Sri Raj Paul, Kuldeep S. Meel, Tiago Cogumberoio, and John M. Mellor-Crummeay. 23rd International European Conference on Parallel and Distributed Computing (EuroPAR), August 2016.


- **Efficient Checkpointing of Multi-Threaded Applications as a Tool for Debugging, Performance Tuning, and Resilience.** Max Grossman, Vivek Sarkar. IEEE International Parallel and Distributed Processing Symposium (IPDPS), May 2016.

- **Compiler support for phase ordering:** Tiago Cogumberoio, Jun Shirako, Vivek Sarkar. Programming Language Approaches to Concurrency- and Communication-cEntric Software (PLACES 2016), April 2016 [resource page].


- **Static Data Race Detection for SPMD Programs via an Extended Polyhedral Representation.** Prasanth Chatarasi, Jun Shirako, Vivek Sarkar. 6th International Workshop on Polyhedral Compilation Techniques (IMPACT 2016), January 2016 [slides].

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**2015**


• LLVM-based Communication Optimizations for PGAS Programs. Akihiro Hayashi, Jisheng Zhao, Michael Ferguson, Vivek Sarkar. The 2nd Workshop on the LLVM Compiler Infrastructure in HPC (LLVM, co-located with SC15), November, 2015.
  * Extending Polyhedral Model for Analysis and Transformations of OpenMP Programs. Prasanth Chatarasi, and Vivek Sarkar. PACT ACM Student Research Competition, October 2015. [accepted as poster with accompanying extended abstract][poster].
  * Polyhedral Optimizations of Explicitly Parallel Programs. Prasanth Chatarasi, Jun Shirako, and Vivek Sarkar. 24th International Conference on Parallel Architectures and Compilation Techniques (PACT), October 2015. One of four papers selected for Best Paper session [slides].
  * Compiling and Optimizing Java 8 Programs for GPU Execution. Kazuaki Ishizaki, Akihiro Hayashi, Gita Koblents, Vivek Sarkar, 24th International Conference on Parallel Architectures and Compilation Techniques (PACT), October 2015.
• Polyhedral Optimizations for a Data-Flow Graph Language. Alina Sbirlea, Jun Shirako, Louis-Noel Pouchet, Vivek Sarkar. The 28th International Workshop on Languages and Compilers for Parallel Computing (LCPC), September 2015.
• A Composable Deadlock-free Approach to Object-based Isolation. Shams Imam, Jisheng Zhao, Vivek Sarkar. 21st International European Conference on Parallel and Distributed Computing (Euro-Par'15), August 2015. [paper]
• Load Balancing Prioritized Tasks via Work-Stealing. Shams Imam, Vivek Sarkar. 21st International European Conference on Parallel and Distributed Computing (Euro-Par’15), August 2015. [paper]
• Polyhedral Transformations of Explicitly Parallel Programs. Prasanth Chatarasi, Jun Shirako, Vivek Sarkar. 5th International Workshop on Polyhedral Compilation Techniques (IMPACT 2015), January 2015. [slides]

• HabaneroUPC++: a Compiler-free PGAS Library, Vivek Kumar, Yili Zheng, Vincent Cave, Zoran Budimlic, Vivek Sarkar. 8th International Conference on Partitioned Global Address Space Programming Models (PGAS14), October 2014. [slides]


• Cooperative Scheduling of Parallel Tasks with General Synchronization Patterns. Shams Imam, Vivek Sarkar. 28th European Conference on Object-Oriented Programming (ECOOP), July 2014. [paper, slides]


• Explicit Implicit Parallelism in Dynamic Array Programming Languages, Shams Imam, Vivek Sarkar, David Labs, Peter B. Kessler. ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming (ARRAY ’14), June 2014. [paper, slides]

• A Case for Cooperative Scheduling in X10’s Managed Runtime. Shams Imam, Vivek Sarkar. The 2014 X10 Workshop (X10’14), June 2014. [paper, slides]


• LLVM Optimizations for PGAS Programs -Case Study: LLVM Wide Optimization in Chapel-. Akhiro Hayashi, Rishi Surendran, Jisheng Zhao, Michael Ferguson, Vivek Sarkar. The 1st Chapel Implementers and Users Workshop (co-located with IPDPS2014), May 2014.


2013


• Speculative Execution of Parallel Programs with Precise Exception Semantics on GPUs. Akhiro Hayashi, Max Grossman, Jisheng Zhao, Jun Shirako, Vivek Sarkar. The 26th International Workshop on Languages and Compilers for Parallel Computing (LCPC), September 2013.

• Expressing DOACROSS Loop Dependencies in OpenMP. Jun Shirako, Priya Unnikrishnan, Sanjay Chatterjee, Kelvin Li, Vivek Sarkar. 9th International Workshop on OpenMP (IWOMP), September 2013.

• Accelerating Habanero-Java Programs with OpenCL Generation . Akhiro Hayashi, Max Grossman, Jisheng Zhao, Jun Shirako, Vivek Sarkar. 10th International Conference on the Principles and Practice of Programming in Java (PPPJ), September 2013.
- Interprocedural Strength Reduction of Critical Sections in Explicitly-Parallel Programs. Rajkishore Barik, Jisheng Zhao, Vivek Sarkar. The 22nd International Conference on Parallel Architectures and Compilation Techniques (PACT), September 2013.
- Oil and Water can mix! Experiences with integrating Polyhedral and AST-based Transformations. Jun Shirako, Vivek Sarkar. 17th Workshop on Compilers for Parallel Programming (CPC), July 2013.
- HJ-Hadoop: An Optimized MapReduce Runtime for Multi-core Systems. Yunning Zhang, Alan Cox, Vivek Sarkar. 5th USENIX Workshop on Hot Topics in Parallelism (HotPar ’13), June 2013. [accepted as poster with accompanying paper], [slides]

2012
- Scalable and Precise Dynamic Data Race Detection for Structured Parallelism. Raghavan Raman, Jisheng Zhao, Vivek Sarkar, Martin Vechev, Eran Yahav. 33rd ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI), June 2012. [slides]
- An extended version of this paper along with the correctness proofs can be found in Technical Report TR12-01.
- CrnC-Blotu: Multicore Programming with High Productivity. Shams Imam, Vivek Sarkar. 4th USENIX Workshop on Hot Topics in Parallelism (HotPar '12), June 2012. [accepted as poster with accompanying paper]. [paper]
2011

- **Intermediate Language Extensions for Parallelism.** Jisheng Zhao, Vivek Sarkar. 5th Workshop on Virtual Machine and Intermediate Languages (VMIL’11), October 2011.
- **Interfacing Chapel with Traditional HPC Programming Languages.** Adrian Prantl, Thomas Boger, Shams Imam, Vivek Sarkar. PQAS11 Proceedings, October 2011. [paper, slides]
- **Data-Driven Tasks and their Implementation.** Sagnak Tasirlar, Vivek Sarkar. Proceedings of the International Conference on Parallel Processing (ICPP) 2011, September 2011. [slides]
- **Dynamic Task Parallelism with a GPU Work-Stealing Runtime System.** Sanjay Chatterjee, Max Grossman, Alina Sbirlea, Vivek Sarkar. 2011 Workshop on Languages and Compilers for Parallel Computing (LCPC), September 2011. [slides]
- **Unifying Barrier and Point-to-Point Synchronization in OpenMP with Phasers.** Jun Shirako, Kamal Sharma, Vivek Sarkar. 7th International Workshop on OpenMP (IWOMP), June 2011. [slides]
- **Communication Optimizations for Distributed-Memory X10 Programs.** Rajkishore Barik, Jisheng Zhao, David Grove, Igor Peshansky, Zoran Budimlic, Vivek Sarkar. 25th IEEE International Parallel and Distributed Processing Symposium (IPDPS), May 2011.
- **Scheduling Macro-Dataflow Programs on Task-Parallel Runtime Systems.** Sagnak Tasirlar, Master’s thesis, April 2011. [slides]
- **Lightweight Dynamic Task Creation and Scheduling on the Intel Single Chip Cloud (SCC) Processor.** Deepak Majeti, Fourth Workshop on Programming Language Approaches to Concurrency and Communication-Centric Software (PLACES 2011), April 2011. [slides]
- **Efficient Date Race Detection for Async-Finish Parallelism.** Raghavan Raman, Jisheng Zhao, Vivek Sarkar, Martin Vechev, Eran Yahav. Proceedings of the 1st International Conference on Runtime Verification (RV ’10), November 2010. Recipient of Best Paper Award. [slides]
• **CnC-CUDA: Declarative Programming for GPUs.** Max Grossman, Alina Simion Sbirlea, Zoran Budimlic, Vivek Sarkar. 2010 Workshop on Languages and Compilers for Parallel Computing (LCPC), October 2010. [doi]

• **Parallel Object-Oriented Scientific Computing with Habanero-Java.** Zoran Budimlic, Vincent Cave, Jun Shirako, Yonghong Yan, Jisheng Zhao, Vivek Sarkar, Michael Glinisky, James Curran. 9th Workshop on Parallel/High-Performance Object-Oriented Scientific Computing (POOSC’10), co-located with SPLASH 2010, October 2010.

• **Modeling and Mapping for Customizable Domain-Specific Computing.** Zoran Budimlic, Alex Bui, Jason Cong, Glenn Reinman, Vivek Sarkar. Workshop on Concurrency for the Application Programmer (CAP), co-located with SPLASH 2010, October 2010.

• **Comparing the Usability of Library vs. Language Approaches to Task Parallelism.** Vincent Cave, Zoran Budimlic, Vivek Sarkar. Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU), co-located with SPLASH 2010, October 2010.

• **Reducing Task Creation and Termination Overhead in Explicitly Parallel Programs.** Jisheng Zhao, Jun Shirako, Krishna V. Nandivada, Vivek Sarkar. The Nineteenth International Conference on Parallel Architectures and Compilation Techniques (PACT), September 2010.


• **Concurrent Collections.** Zoran Budimlic, Michael Burke, Vincent Cave, Kathleen Knobe, Geoff Lowney, Ryan Newton, Jens Palsberg, David Peixotto, Vivek Sarkar, Frank Schlimbach, Sagnak Tasirilir. Scientific Programming, 18:3-4, pp. 203-217, August 2010.


• **Hierarchical Phasers for Synchronisation and Reduction.** Jun Shirako, Vivek Sarkar. 24th IEEE International Parallel and Distributed Processing Symposium (IPDPS), April 2010.


2009

• **Hierarchical Place Trees: A Portable Abstraction for Task Parallelism and Date Movement.** Yonghong Yan, Jisheng Zhao, Yi Guo, Vivek Sarkar. Proceedings of the 22nd Workshop on Languages and Compilers for Parallel Computing (LCPC), October 2009.


• **Interprocedural Load Elimination for Dynamic Optimization of Parallel Programs.** Rajkishore Barik, Vivek Sarkar. The Eighteenth International Conference on Parallel Architectures and Compilation Techniques (PACT), September 2009. One of three papers selected for Best Paper session.


• **Work-First and Help-First Scheduling Policies for Terminally Strict Parallel Programs.** Yi Guo, Rajkishore Barik, Raghavan Raman, Vivek Sarkar. 23rd IEEE International Parallel and Distributed Processing Symposium (IPDPS), May 2009.


2008


**2007**


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