Milind Kulkarni

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Purdue University
465 Northwestern Avenue
West Lafayette, IN 47907

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(updated February 2017)

EDUCATION

North Carolina State University
Raleigh, NC — B.S. in Computer Science (Summa Cum Laude & with Honors), 2002

North Carolina State University
Raleigh, NC — B.S. in Computer Engineering (Summa Cum Laude), 2002

Cornell University
Ithaca, NY — M.S. in Computer Science, 2005

Cornell University
Ithaca, NY — Ph.D. in Computer Science, 2008

PROFESSIONAL AND HONOR SOCIETY MEMBERSHIPS

Society for Industrial and Applied Mathematics (SIAM)
Member 2010–present
Member of SIAM activity groups on Supercomputing (SIAM SC)

Association of Computing Machinery (ACM)
Member 2008–present
Member of Special Interest Group on Programming Languages (SIGPLAN)

Institute of Electrical and Electronics Engineering (IEEE)
Member 2008–present
Member of Computer Society

Honor Society of Phi Kappa Phi
Member 2001–present

AWARDS & HONORS

[1] Department of Energy High Performance Computer Science Fellowship, 2004-2008. *Provided full tuition support and stipend for four years of graduate study. ~3 fellows selected per year.*

[2] "Optimistic Parallelism Requires Abstractions" selected to appear in Research Highlights in the Communications of the ACM. *One of 24 papers selected per year across all fields of computer science.*

[3] "Structure-driven Optimizations for Amorphous Data-parallel Programs" nominated for best paper at PPoPP 2010. One of 3 nominees.

[4] Purdue Nominee for Microsoft Research New Faculty Fellowship (2011)

[5] Recipient of NSF CAREER Award (2012)

[6] Wilfred "Duke" Hesselberth Award for Teaching Excellence (2012)

[7] Recipient of DOE Early Career Award (2013)

[8] Purdue Seed for Success Award (2013)

[9] Purdue Teaching for Tomorrow Fellow (2014–2015)

[10] Ruth and Joel Spira Outstanding Teaching Award (2014)

[11] College of Engineering Exceptional Early Career Teaching Award (2015)

[12] Presidential Early Career Award for Scientists and Engineers (2016)

[13] Purdue Seed for Success Award (2016)

PROFESSIONAL EXPERIENCE

Teaching Assistant
Department of Computer Science
Cornell University, Ithaca, NY
August 2002 – May 2003

Graduate Research Assistant
Department of Computer Science
Cornell University, Ithaca, NY
May 2003 – May 2008

Summer Research Student
Lawrence Livermore National Laboratories, Livermore, CA
May 2005 – September 2005

Postdoctoral Research Associate
Institute for Computational Engineering and Sciences (ICES)
The University of Texas at Austin, Austin, TX
May 2008 – August 2009

Assistant Professor
School of Electrical and Computer Engineering
Purdue University, West Lafayette, IN
August 2009 – present

Associate Professor
School of Electrical and Computer Engineering
Purdue University, West Lafayette, IN
August 2015 – present

RESEARCH GRANTS AND CONTRACTS RECEIVED

[1] **Adaptive Run-time Systems for Parallel Irregular Programs**
Co-Principal Investigator (PI: Richard Buckius)
PRF XR Research Grant, #204533
6/1/10–5/31/11. $16,795

[2] **Intel Corporation**
Principal Investigator
Unrestricted Gift
$35,000

[3] **"CAREER: Toward a locality-enhancing transformation framework for irregular programs"**
Principal Investigator
National Science Foundation, Award No. CCF-1150013
2/1/12–1/31/17. $418,786.00

[4] **"SLEEC: Semantics-rich Libraries for Effective Exascale Computation"**
Principal Investigator (co-PIs: Samuel Midkiff, Vijay Pai, Arun Prakash, Purdue University; Michael Parks, Sandia National Labs)
Department of Energy, Office of Science, ASCR, Award No. DE-FC02-12ER26104
9/1/12–8/31/15. $1,500,000 (Purdue share: $1,200,000)

[5] **"Collaborative Research: Conceptualizing an Institute for Using Inter-domain Abstractions to Support Inter-disciplinary Applications"**
Co-Principal Investigator (PI: Samuel Midkiff, Purdue University; co-PIs: Vijay Pai, Arun Prakash, James Caruthers, Purdue University; David Padua, John Hart, Philippe Geubelle, UIUC; Keshav Pingali, Ron Elber, Chandrajit Bajaj, University of Texas)
National Science Foundation, Award No. OCI-1216809
10/1/12–9/31/13. $495,036 (Purdue share: $215,073)

[6] **"Compiler and run-time approaches to enable large scale irregular programs"**
Principal Investigator
Department of Energy, Office of Science, ASCR, Award No. DE-SC0010295 (Early Career Award)
7/15/13–7/14/18. $750,000

[7] **"XPS: CLCCA: On the Hunt for Correctness and Performance Bugs in Large-scale Programs"**

Principal Investigator (co-PIs: Saurabh Bagchi, Michael Gribskov)
National Science Foundation, Award No. CCF-1337158
9/15/13–8/31/15. $260,331

[8] **"XPS: CLCCA: On the Hunt for Correctness and Performance Bugs in Large-scale Programs (Supplemental REU)"**
Principal Investigator (co-PIs: Saurabh Bagchi)
National Science Foundation, Award No. CCF-1337158
9/15/13–8/31/15. $16,000

[9] **"II-New: A Cluster of Nodes with 32 Cores and 256-GB Memory to Enable Many-Core Systems Research and Education"**
Co-Principal Investigator (PI: T.N. Vijaykumar; co-PIs: Mithuna Thottethodi, Vijay Pai, Antony Hosking, Purdue University)
National Science Foundation, Award No. CRI-1405939
8/1/14–7/31/17. $286,300

[10] **"CI-EN: Enhancing the Cetus Compiler Infrastructure"**
Co-Principal Investigator (PI: Samuel Midkiff, Purdue University)
National Science Foundation, Award No. CRI-1405954
9/1/14–8/31/17. $563,944

[11] **"SHF: Small: Collaborative Research: Hybrid Static-Dynamic Analyses for Region Serializability"**
Co-Principal Investigator (PI: Michael D. Bond, Ohio State University)
National Science Foundation, Award No. CCF-1422178
9/1/14–8/31/17. $438,706 (Purdue share: $73,727)

[12] **"XPS: FULL: FP: Collaborative Research: Taming parallelism: optimally exploiting high-throughput parallel architectures"**
Principal Investigator
(co-PI: Kunal Agrawal, Washington University in St. Louis)
National Science Foundation, Award No. CCF-1439126
9/1/14–8/31/18. $659,821 (Purdue share: $329,571)

[13] **"SLEEC: Semantics-rich Libraries for Effective Exascale Computation (Renewal)"**
Principal Investigator (co-PIs: Samuel Midkiff, Arun Prakash, Purdue University; Michael Parks, Sandia National Labs)
Department of Energy, Office of Science, ASCR, Award No. DE-FC02-12ER26104
9/1/15–8/31/16. $250,000 (Purdue share: $200,000)

[14] **"Hazards SEES: Bridging Information, Uncertainty, and Decision-Making in Hurricanes using an Interdisciplinary Perspective"**
Co-Principal Investigator (PI: Satish Ukkusuri, Purdue University; co-PIs: Seungyoon Lee, Purdue University; Pamela Murray-Tuite, Virginia Tech; Yue Ge, Daniel Klenow, North Dakota State University)
National Science Foundation, Award No. SEES-1520338

11/1/15–10/31/19. $2,475,000

[15] **"SI2-SSI: Collaborative Research: ParaTreet: Parallel Software for Spatial Trees in Simulation and Analysis"**
Co-Principal Investigator
(Joint project. Overall PI: Tom Quinn, University of Washington; co-PIs: Magdalena Balazinska, University of Washington; Laxmikant Kale, John Hart, UIUC; Derek Richardson, Wolfgang Losert, University of Maryland; Orion Lawlor, University of Alaska)
National Science Foundation, Award No. SEES-1520338
9/1/16–8/31/17. $473,584 (Purdue share: $54,297)

PROFESSIONAL SOCIETY ACTIVITIES

ACM SIGPLAN Symposium on Principles and Practices of Parallel Programming (PPoPP)
Program Committee Member & Session Chair. January 2010
Program Committee Member. January 2011
External Review Committee Member. January 2012
External Review Committee Member. January 2013
Program Committee Member & Session Chair. February 2014
External Review Committee Member. February 2015

ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)
Program Committee Member. April 2010

IEEE International Parallel & Distributed Processing Symposium (IPDPS)
Program Committee Member. May 2011
Program Committee Member. May 2012
Program Committee Member. May 2013

International Conference on Parallel Architecture and Compilation Techniques (PACT)
Program Committee Member. September, 2011

ACM SIGPLAN Conference on Programming Languages Design and Implementation (PLDI)
External Review Committee Member. June 2011
Program Committee Member. June 2014
External Review Committee Member. June 2015
Program Committee Member. June 2017

International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing)
Program Committee Member & Session Chair. November 2012
Program Committee Member. November 2013

Program Committee Member & Session Chair. November 2014
Program Committee Member. November 2017

ACM SIGPLAN Conference on Object Oriented Programming Languages, Systems and Applications (OOPSLA)
Program Committee Member. October 2014
Program Committee Member. October 2016

ACM SIGPLAN Workshop on Memory Systems Performance and Correctness (MSPC)
Program Committee Co-Chair. June 2014

Referee/Reviewer
HotPar 2010, ASPLOS 2010, POPL 2010, MICRO 2009, OOPSLA 2009, IPDPS 2009, CGO 2009, ASPLOS 2008, PLDI 2007, LCPC 2007, ASPLOS 2006

MASTER'S THESIS SUPERVISION COMPLETED

Kanad Sinha
M.S., Electrical and Computer Engineering
May, 2011, "Techniques for fine-grained, multi-site computation offloading"

Yusheng Weijiang
M.S., Electrical and Computer Engineering
May, 2015, "Tree dependence analysis"

Shruthi Balakrishna
M.S., Electrical and Computer Engineering
May, 2015, "Characterization of vectorization strategies for recursive algorithms"

Nouraldin Jaber
M.S., Electrical and Computer Engineering
August, 2015, "Data structure-aware computation offloading"

PH.D. STUDENTS SUPERVISION COMPLETED

Youngjoon Jo
Ph.D, Electrical and Computer Engineering
December, 2013, "Automatically optimizing tree-traversal algorithms"

Bowen Zhou
Ph.D, Computer Science (Co-advised with Saurabh Bagchi)
December, 2014, "Techniques for detecting scalability bugs"

Nabeel AlSaber
Ph.D, Electrical and Computer Engineering
May, 2015, "SemCache: Semantics aware caching for effective GPU offloading"

M. Hasan Jamal
Ph.D, Computer Science (Co-advised with Saurabh Bagchi)
December, 2015, "Semantics-aware optimization framework for multi-scale computational methods"

GRADUATE STUDENTS CURRENTLY SUPERVISED

Jad Hbeika
Ph.D., Electrical and Computer Engineering

Kanak Mahadik
Ph.D., Electrical and Computer Engineering (Co-advised with Saurabh Bagchi)

Nikhil Hegde
Ph.D., Electrical and Computer Engineering

Jianqiao Liu
Ph.D., Electrical and Computer Engineering

Nouraldin Jaber
Ph.D., Electrical and Computer Engineering

Kirshanthan Sundararajah
Ph.D., Electrical and Computer Engineering

Laith Sakka
Ph.D., Electrical and Computer Engineering

Christopher Wright
Ph.D., Electrical and Computer Engineering (Co-advised with Saurabh Bagchi)

COURSES TAUGHT

ECE 468 – Introduction to Compilers and Translation Systems Engineering
Fall 2010, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Fall 2015

ECE 663 – Advanced Optimizing Compilers
Spring 2010

ECE 573 – Compiler and Translation Systems Engineering
Fall 2009, Spring 2011, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Fall 2015

ECE 264 – Advanced C Programming
Spring 2017

SCHOOL COMMITTEE ACTIVITIES

Graduate Admissions
Member, Fall 2009 – Fall 2014

Associate Director, Fall 2014 – present

Curriculum Committee
Member, Fall 2012 – Fall 2014

ENGINEERING-WIDE ACTIVITIES

Computational Science and Engineering
ECE representative to CS&E program, Fall 2009 – present

UNIVERSITY-WIDE ACTIVITIES

Purdue Young Faculty Association (PYFA)
co-Chair, 6/2010 – 5/2011

JOURNAL ARTICLES

[1] **An Experimental Study of Self-Optimizing Dense Linear Algebra Software**
Milind Kulkarni and Keshav Pingali
Proceedings of IEEE. 96(5):832–848, 2008

[2] **Optimistic Parallelism Requires Abstractions**
Milind Kulkarni, Keshav Pingali, Bruce Walter, Ganesh Ramanarayanan, Kavita Bala and L. Paul Chew
Research Highlights. Communications of the ACM (CACM). 52(9):89–97, 2009

[3] **Debugging High-Performance Computing Applications at Massive Scales**
Ignacio Laguna, Dong H. Ahn, Bronis R. de Supinski, Todd Gamblin, Gregory L. Lee, Martin Schulz, Saurabh Bagchi, Milind Kulkarni, Bowen Zhou, Zhezhe Chen and Feng Qin
Communications of the ACM (CACM). 58(9):72–81, 2015

[4] **Exploiting Semantics of Temporal Multi-scale Methods to Optimize Multi-level Mesh Partitioning**
M. Hasan Jamal, Arun Prakash and Milind Kulkarni
International Journal of Numerical Methods in Engineering (IJNME). In press.

REFEREED CONFERENCE PROCEEDINGS AND PRESENTATIONS

[1] **Optimistic Parallelism Requires Abstractions**
Milind Kulkarni, Keshav Pingali, Bruce Walter, Ganesh Ramanarayanan, Kavita Bala and L. Paul Chew
Presented paper.
Programming Languages Design and Implementation (PLDI) 2007
San Diego, CA. June 2007. Pages 211–212

[2] **Optimistic Parallelism Benefits From Data Partitioning**
Milind Kulkarni, Keshav Pingali, Ganesh Ramanarayanan, Bruce Walter, Kavita Bala and L. Paul Chew

Presented paper.
Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2008
Seattle, WA. March 2008. Pages 233–243

[3] **Scheduling Strategies for Optimistic Parallel Execution of Irregular Programs**
Milind Kulkarni, Patrick Carribault, Keshav Pingali, Ganesh Ramanaraynan, Bruce Walter, Kavita Bala and L. Paul Chew
Presented paper.
Symposium on Parallelism in Algorithms and Architectures (SPAA) 2008
Munich, Germany. June 2008. Pages 217–228

[4] **Fast Agglomerative Clustering for Rendering**
Bruce Walter, Kavita Bala, Milind Kulkarni and Keshav Pingali
Interactive Ray-Tracing Symposium (RT) 2008
Los Angeles, CA. August 2008. Pages 81–86

[5] **How Much Parallelism is There in Irregular Applications?**
Milind Kulkarni, Martin Burtscher, Rajeshkar Inkulu, Keshav Pingali and Calin Cascaval
Presented paper.
Principles and Practices of Parallel Programming (PPoPP) 2009
Raleigh, NC. February 2009. Pages 3–14

[6] **Lonestar: A Suite of Parallel Irregular Programs**
Milind Kulkarni, Martin Burtscher, Keshav Pingali and Calin Cascaval
Presented paper.
International Symposium on Performance Analysis of Systems and Software (ISPASS) 2009
Boston, MA. April 2009. Pages 65–76

[7] **Structure-driven Optimizations for Amorphous Data-parallel Programs**
Mario Mendez-Lojo, Donald Nguyen, Dimitrios Prountzos, Xin Sui, Muhammad Hassan, Milind Kulkarni, Martin Burtscher and Keshav Pingali
Principles and Practices of Parallel Programming (PPoPP) 2010
Bangalore, India. January 2010. Pages 3–14

[8] **Accelerating Multicore Reuse Distance Analysis with Sampling and Parallelization**
Derek Schuff, Milind Kulkarni and Vijay Pai
Parallel Architectures and Compilation Techniques (PACT) 2010
Vienna, Austria. September 2010. Pages 53–64

[9] **uSETL: A Set Based Programming Abstraction for Wireless Sensor Networks**
Mohammad S. Hossain, A. B. M. Alim al Islam, Milind Kulkarni and Vijay Raghunathan

Information Processing in Sensor Networks (IPSN) 2011
Chicago, IL. April 2011. Pages 354–365

[10] **Techniques for Fine-grained, Multi-site Computation Offloading**
Kanad Sinha and Milind Kulkarni
International Symposium on Cluster, Cloud, and Grid Computing (CCGrid) 2011
Newport Beach, CA. May 2011. Pages 184–194

[11] **The Tao of Parallelism in Algorithms**
Keshav Pingali, Donald Nguyen, Milind Kulkarni, Martin Burtscher, M. Amber Hassan, Rashid Kaleem, Tsung-Hsien Lee, Andrew Lenharth, Roman Manevich, Mario Mendez-Lojo, Dimitrios Prountzos and Xin Sui
Programming Languages Design and Implementation (PLDI) 2011
San Jose, CA. June 2011. Pages 12–25

[12] **Exploiting the Commutativity Lattice**
Milind Kulkarni, Donald Nguyen, Dimitrios Prountzos, Xin Sui and Keshav Pingali
Presented paper.
Programming Languages Design and Implementation (PLDI) 2011
San Jose, CA. June 2011. Pages 542–555

[13] **Vrisha: Using Scaling Properties of Parallel Programs for Bug Detection and Localization**
Bowen Zhou, Milind Kulkarni and Saurabh Bagchi
Symposium on High Performance Parallel and Distributed Computing (HPDC) 2011
San Jose, CA. June 2011. Pages 85–96

[14] **InContext: Simple Parallelism for Distributed Applications**
Sungwhan Yoo, Hyojeong Lee, Charles Killian and Milind Kulkarni
Symposium on High Performance Parallel and Distributed Computing (HPDC) 2011
San Jose, CA. June 2011. Pages 97–108

[15] **Enhancing Locality for Recursive Traversals of Recursive Structures**
Youngjoon Jo and Milind Kulkarni
Object-Oriented Programming Systems, Languages and Applications (OOPSLA) 2011
Portland, OR. October 2011. Pages 463–482

[16] **Automatically Enhancing Locality for Tree Traversals with Traversal Splicing**
Youngjoon Jo and Milind Kulkarni
Object-Oriented Programming Systems, Languages and Applications (OOPSLA) 2012
Tuscon, AZ. October 2012. Pages 355–374

[17] **SemCache: Semantics-aware Caching for Efficient GPU Offloading**
Nabeel AlSaber and Milind Kulkarni

International Conference on Supercomputing (ICS) 2013
Eugene, OR. June 2013. Pages 421–432

[18] **Exploiting Domain Knowledge to Optimize Parallel Computational Mechanics Codes**
Chenyang Liu, Hasan Jamal, Milind Kulkarni, Arun Prakash and Vijay Pai
International Conference on Supercomputing (ICS) 2013
Eugene, OR. June 2013. Pages 25–36

[19] **WuKong: Automatically Detecting and Localizing Bugs that Manifest at Large System Scales**
Bowen Zhou, Jonathan Too, Milind Kulkarni and Saurabh Bagchi
Symposium on High Performance Parallel and Distributed Computing (HPDC) 2013
New York, NY. June 2013. Pages 131–142

[20] **Automatic Vectorization of Tree Traversals**
Youngjoon Jo, Michael Goldfarb and Milind Kulkarni
Parallel Architectures and Compilation Techniques (PACT) 2013
Edinburgh, Scotland, UK. September 2013. Pages 363–374

[21] **EventWave: Programming Model and Runtime Support for Tightly-Coupled Elastic Cloud Applications**
Wei-Chiu Chuang, Bo Sang, Sunghwan Yoo, Rui Gu, Charles Killian and Milind Kulkarni
Symposium on Cloud Computing (SoCC) 2013
Santa Clara, CA. October 2013. Pages 21:1–21:16

[22] **Octet: Capturing and Controlling Cross-Thread Dependences Efficiently**
Michael D. Bond, Milind Kulkarni, Man Cao, Minjia Zhang, Meisam Fathi Salmi, Swarnendu Biswas, Aritra Sengupta and Jipeng Huang
Object-Oriented Programming, Systems, Languages & Applications (OOPSLA) 2013
Indianapolis, IN. October 2013. Pages 693–712

[23] **General transformations for GPU execution of tree traversals**
Michael Goldfarb, Youngjoon Jo and Milind Kulkarni
The International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing) 2013
Denver, CO. November 2013. Pages 10:1–10:12

[24] **Orion: Scaling Genomic Sequence Matching with Fine-Grained Parallelization**
Kanak Mahadik, Somali Chaterji, Bowen Zhou, Milind Kulkarni and Saurabh Bagchi
The International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing) 2014.
New Orleans, LA. October 2014. Pages 449–460

[25] **Hybrid Static–Dynamic Analysis for Statically Bounded Region Serializability**
Aritra Sengupta, Swarnendu Biswas, Minjia Zhang, Michael D. Bond and Milind Kulkarni
Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2015. Istanbul, Turkey. March 2015. Pages 561–575

[26] **Tree Dependence Analysis**
Yusheng Weijiang, Shruthi Balakrishna, Jianqiao Liu and Milind Kulkarni
Programming Languages Design and Implementation (PLDI) 2015. Portland, OR. June 2015. Pages 314–325

[27] **Efficient Execution of Recursive Programs on Commodity Vector Hardware**
Bin Ren, Youngjoon Jo, Sriram Krishnamoorthy, Kunal Agrawal and Milind Kulkarni
Programming Languages Design and Implementation (PLDI) 2015. Portland, OR. June 2015. Pages 509–520

[28] **SemCache++: Semantics-Aware Caching for Efficient Multi-GPU Offloading**
Nabeel AlSaber and Milind Kulkarni
International Conference on Supercomputing (ICS) 2015. Newport Beach, CA. June 2015. Pages 79–88

[29] **Efficient Deterministic Replay of Multithreaded Executions in a Managed Language Virtual Machine**
Michael Bond, Milind Kulkarni, Man Cao, Meisam Fathi Salmi and Jipeng Huang
Principles and Practice of Programming in Java (PPPJ) 2015. Melbourne, FL. September, 2015. Pages 90–101

[30] **Toward Efficient Strong Memory Model Support for the Java Platform via Hybrid Synchronization**
Aritra Sengupta, Man Cao, Michael Bond and Milind Kulkarni
Principles and Practice of Programming in Java (PPPJ) 2015. Melbourne, FL. September, 2015. Pages 65–75

[31] **Hybrid CPU-GPU Scheduling and Execution of Tree Traversals**
Jianqiao Liu, Nikhil Hegde and Milind Kulkarni
International Conference on Supercomputing (ICS) 2016. Istanbul, Turkey. June 2016. Pages 2:1–2:12

[32] **SARVAVID: A Domain Specific Language for Developing Scalable Computational Genomics Applications**
Kanak Mahadik, Chris Wright, Jinyi Zhang, Milind Kulkarni, Saurabh Bagchi and Somali Chaterji

International Conference on Supercomputing (ICS) 2016.
Istanbul, Turkey. June 2016. Pages 34:1–34:12

[33] **Legato: End-to-End Bounded Region Serializability Using Commodity Hardware Transactional Memory**
Aritra Sengupta, Man Cao, Michael Bond and Milind Kulkarni
International Symposium on Code Generation and Optimization (CGO) 2017.
Austin, TX. February 2017. To appear

[34] **Processor-Oblivious Record and Replay**
Robert Utterback, Kunal Agrawal, I-Ting Angelina Lee and Milind Kulkarni
Principles and Practice of Parallel Programming (PPoPP) 2017.
Austin, TX. February 2017. To appear

[35] **Exploiting Vector and Multicore Parallelism for Recursive Data- and Task-Parallel Programs**
Bin Ren, Sriram Krishnamoorthy, Kunal Agrawal and Milind Kulkarni
Principles and Practice of Parallel Programming (PPoPP) 2017.
Austin, TX. February 2017. To appear

[36] **Data Structure–Aware Heap Partitioning**
Nouraldin Jaber and Milind Kulkarni
Compiler Construction (CC) 2017.
Austin, TX. February 2017. To appear

[37] **Locality Transformations for Nested Recursive Iteration Spaces**
Kirshanthan Sundararajah, Laith Sakka and Milind Kulkarni
Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2017.
Xi'an, China. April 2017. To appear

[38] **Treelogy: A Benchmark Suite for Tree Traversals**
Kirshanthan Sundararajah, Laith Sakka and Milind Kulkarni
International Symposium on Performance Analysis of Systems and Software (ISPASS) 2017. San Francisco, CA. April 2017. To appear

POSTERS, BRIEF ANNOUNCEMENTS, ETC.

[1] **Brief Announcement: Locality-Aware Load Balancing for Speculatively-Parallelized Irregular Applications**
Youngjoon Jo and Milind Kulkarni
Symposium on Parallelism in Algorithms and Architectures (SPAA) 2010
Santorini, Greece. June 2010. Pages 183–185

[2] **Brief Announcement: Locality-enhancing Transformations for Tree Traversal Algorithms**
Youngjoon Jo and Milind Kulkarni
Symposium on Parallelism in Algorithms and Architectures (SPAA)
San Jose, CA. June 2011. Pages 263–264

[3] **Poster: WuKong: Effective Diagnosis of Bugs at Large System Scales**
Bowen Zhou, Milind Kulkarni and Saurabh Bagchi
Principles and Practices of Parallel Programming (PPoPP) 2013
Shenzhen, China. February 2013. Pages 317–318

[4] **Poster: SemCache++: Semantics-aware Caching for Efficient Multi-GPU Offloading**
Nabeel AlSaber and Milind Kulkarni
Principles and Practices of Parallel Programming (PPoPP) 2015.
San Francisco, CA. February 2015. Pages 255–256

[5] **Poster: MANGO: scalable modularity for transparently elastic cloud applications**
Wei-Chiu Chuang, Charles Killian and Milind Kulkarni
Networked Systems Design and Implementation (NSDI) 2015.
Oakland, CA. May 2015.

[6] **Poster: Exploiting Domain Knowledge to Optimize Mesh Partitioning for Multiscale Methods**
M. Hasan Jamal, Milind Kulkarni and Arun Prakash
The International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing) 2015.
Austin, TX. November 2015.

[7] **Position Paper: Beyond Big Data-Rethinking Programming Languages for Non-Persistent Data**
Milind Kulkarni and Yung-Hsiang Lu
International Conference on Cloud Computing and Big Data (CCBD) 2015.
Taipei, Taiwan. November 2015. Pages 245–251

[8] **Position Paper: Programming Language Support for Analyzing Non-Persistent Data**
Yung-Hsiang Lu, Milind Kulkarni, Nouraldin Jaber and Jerry Xiaojin Zhu
IEEE Symposium on Technologies for Homeland Security (HST) 2016.
Waltham, MA. May 2016. Pages 1–4

[9] **Poster: SPIRIT: A Runtime System for Distributed Irregular Tree Applications**
Nikhil Hegde, Jianqiao Liu and Milind Kulkarni
Principles and Practices of Parallel Programming (PPoPP) 2016.
Barcelona, Spain. February 2016. Pages 51:1–51:2

[10] **Poster: Hybrid CPU-GPU Scheduling and Execution of Tree Traversals**
Jianqiao Liu, Nikhil Hegde and Milind Kulkarni
Principles and Practices of Parallel Programming (PPoPP) 2016.
Barcelona, Spain. February 2016. Pages 41:1–41:2

[11] **Poster: Treelogy: a benchmark suite for tree traversal applications**
Nikhil Hegde, Jianqiao Liu and Milind Kulkarni
IEEE International Symposium on Workload Characterization (IISWC) 2016. Providence, RI. September 2016. Pages 227–228

REFEREED WORKSHOPS

[1] **Using Transactions in Delaunay Mesh Generation**
Milind Kulkarni, Keshav Pingali and L. Paul Chew
Presented paper.
Workshop on Transactional Memory Workloads (WTW)
Ottawa, Canada. June 2006.

[2] **On the Scalability of an Automatically Parallelized Irregular Application**
Martin Burtscher, Milind Kulkarni, Dimitrios Prountzos and Keshav Pingali
21st Annual Workshop on Languages and Compilers for Parallel Computing (LCPC) Edmonton, Canada. July–August 2008. Pages 109–123

[3] **Towards Architecture Independent Metrics for Multicore Performance Analysis**
Milind Kulkarni, Vijay Pai and Derek Schuff
Third Workshop on Hot Topics in Measurement & Modeling of Computer Systems (HotMetrics) 2010
New York, New York. June 2010.
Appeared in: ACM SIGMETRICS Performance Evaluation Review 38(3):10–14

[4] **Abhranta: Localizing Bugs that Manifest at Large System Scales**
Bowen Zhou, Milind Kulkarni and Saurabh Bagchi
8th Workshop on Hot Topics in System Dependability (HotDep) 2012
Hollywood, CA. October 2012.

[5] **Programming Model Support for Dependable, Elastic Cloud Applications**
Wei-Chiu Chuang, Bo Sang, Charles Killian and Milind Kulkarni
8th Workshop on Hot Topics in System Dependability (HotDep) 2012
Hollywood, CA. October 2012.

[6] **Optimizing the LULESH Stencil Code using Concurrent Collections**
Chenyang Liu and Milind Kulkarni
5th International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLF-HPC) 2015
Austin, TX. November, 2015.

[7] **Evaluating Performance of Task and Data Coarsening in Concurrent Collections**
Chenyang Liu and Milind Kulkarni

29th International Workshop on Languages and Compilers for Parallel Computing (LCPC) 2016
Rochester, NY. September, 2016.

[8] **Locality-aware Task-parallel Execution on GPUs**
Jad Hbeika and Milind Kulkarni
29th International Workshop on Languages and Compilers for Parallel Computing (LCPC) 2016
Rochester, NY. September, 2016.

OTHER PUBLICATIONS

[1] **Scheduling Issues in Optimistic Parallelization**
Milind Kulkarni and Keshav Pingali
NSF Next Generation Software (NGS) Workshop, 2007
Long Beach, CA. March 2007. Pages 1–7

INVITED TALKS

[1] **"Optimistic Parallelism Benefits From Data Partitioning"**
Intel, Santa Monica, CA. March 26, 2008
IBM T.J. Watson Research Labs, Yorktown Heights, NY. January 31, 2008

[2] **"The Galois Project"**
CScADS Autotuning Workshop, Snowbird, UT. July 9, 2008

[3] **"Architecture Independent Metrics for Characterizing Parallelism and Locality"**
ScalPerf Workshop, Bertinoro, Italy. September 23, 2010

[4] **"Exploiting the Commutativity Lattice"**
Verification of Concurrent Data-Structures (Verico), Austin, TX. January 29, 2011
Dagstuhl Workshop, "Abstractions for Scalable Multicore Computing," Wadern, Germany, April 19, 2012

[5] **"Finding and Exploiting Parallelism in Irregular Applications"**
NEC Labs, Princeton, NJ. April 29, 2009
Computer Science Department, Indiana University, Bloomington, IN. April 29, 2010
Department of CS & E, Ohio State University, Columbus, OH. April 22, 2011

[6] **"Automatically Enhancing Locality in Irregular Applications"**
Illinois-Intel Parallelism Center (I2PC), University of Illinois–Urbana Champagne. September 29, 2011
Parallel Computing Laboratory (ParLab), University of California–Berkeley. February 13, 2012
Lawrence Berkeley National Laboratories, Berkeley, CA. April 6, 2012
Hewlett-Packard Labs, Palo Alto, CA. April 9, 2012
Department of Computer Science, University of Texas–Austin. April 24, 2012
Department of Computer Science, University of California–Riverside. May 14, 2012

Department of Electrical Engineering and Computer Science, University of California–Irvine. May 15, 2012
Department of Computer Science and Engineering, University of California–San Diego. May 16, 2012
Department of Computer Science, University of California–Los Angeles. May 17, 2012
Department of Computer Science, University of Washington. May 8, 2013
Microsoft Research, Seattle, WA. May 9, 2013
Department of Computer Science, University of Chicago. May 4, 2014
School of Engineering and Applied Science, Harvard University, Boston, MA. May 9, 2014
Department of Electrical Engineering and Computer Science, MIT, Boston, MA. May 10, 2014
School of Computer Science, University of Massachusetts–Amherst. May 12, 2014
Department of Computer Science, Rice University, Houston, TX. May 13, 2014
Department of Computer Science, North Carolina State University, Raleigh, NC. April 17, 2015

[7] **"General Transformations for GPU Execution of Tree Traversals"**
NVIDIA GPU Technology Conference, San Jose, California, March 27, 2014

[8] **"Efficiently Detecting Cross Thread Memory Dependences to Enforce Stronger Memory Models"**
Dagstuhl Workshop, "Concurrent Computing in the Many Core Era," Wadern, Germany, January 6, 2015

[9] **"Regularizing the Irregular: Analyses and Transformations for Recursive, Irregular Applications"**
ACM Workshop on Functional High Performance Computing (FHPC) [Invited Keynote]. Vancouver, BC, Canada. September 3, 2015
MathWorks [Remote Presentation]. Natick, MA. November 6, 2015
Department of Computer Science and Engineering, Washington University in St. Louis [Departmental Colloquium]. St. Louis, MO. November 13, 2015
Department of Computer Science, Indiana University [Departmental Colloquium]. Bloomington, IN. April 8, 2016
Department of Computer Science and Engineering, University of Washington. Seattle, WA. June 8, 2016

TECH REPORTS

[1] **Amorphous Data-parallelism in Irregular Applications**
Keshav Pingali, Milind Kulkarni, Donald Nguyen, Martin Burtscher, Mario Mendez-Lojo, Dimitrios Prountzos, Xin Sui and Zifei Zhong
The University of Texas at Austin, Department of Computer Sciences, Report# TR-09-05

[2] **Defining and Implementing Commutativity Conditions for Parallel Execution**
Milind Kulkarni, Dimitrios Prountzos, Donald Nguyen and Keshav Pingali
Purdue University, School of Electrical and Computer Engineering,

Report# TR-ECE-09-11

[3] **Locality-enhancing loop transformations for parallel tree traversal algorithms**
Youngjoon Jo and Milind Kulkarni
Purdue University, School of Electrical and Computer Engineering,
Report# TR-ECE-11-03

PATENTS GRANTED AND PENDING

[1] **Programming Model to Exploit Parallelism in Multi-core Systems**
Keshav Pingali and Milind Kulkarni
US Patent #8,863,104. Oct 14, 2014

SOFTWARE ARTIFACTS

[1] **ParaMeter**
A profiling tool for studying parallelism in irregular applications
http://iss.ices.utexas.edu/parameter/

[2] **LoneStar Benchmark Suite**
A suite of irregular applications that are amenable to optimistic parallelization
http://iss.ices.utexas.edu/lonestar/

[3] **The Galois System**
A speculative parallelization system for irregular applications
http://iss.ices.utexas.edu/galois/

[4] **TreeSplicer**
A compiler toolkit for enhancing locality in tree-based irregular programs
https://engineering.purdue.edu/plcl/treesplicer/

[5] **SimTree**
A C++ compiler for transforming applications for easy vectorization
https://engineering.purdue.edu/plcl/simtree/

[6] **Octet**
A dynamic analysis framework for tracking cross-thread dependences
http://sourceforge.net/p/jikesrvm/research-archive/43/

[6] **EnfoRSer**
A dynamic analysis for enforcing bounded region serializability
http://sourceforge.net/p/jikesrvm/research-archive/48/

[7] **Tree Dependence Analysis**
A static analysis to reason about dependences in tree-based recursive code
https://bitbucket.org/plcl/tree-dependence-analysis

[8] **VectorCilk**

A transformation framework to expose vectorization opportunities in recursive, task-parallel programs
https://engineering.purdue.edu/plcl/vectorcilk/index.php

SHORT COURSES TAUGHT, WORKSHOPS ORGANIZED, ETC.

[1] **"Parallelizing Irregular Applications Through the Exploitation of Amorphous Data Parallelism"**
Short course taught.
Principles and Practices of Parallel Programming, Bangalore, India. January 10, 2010

[2] **"Parallelizing Irregular Applications Through the Exploitation of Amorphous Data Parallelism"**
Short course taught.
Programming Languages Design and Implementation, Toronto, CA. June 6, 2010

[3] **"Exploiting Domain Semantics and High-Level Abstractions in Computational Science"**
Birds of a Feather session. Organizer.
Supercomputing, Salt Lake City. November 14, 2012

[4] **"Leveraging Abstractions and Semantics in High Performance Computing (LASH-C)"**
Workshop. Organizer
co-located with Principles and Practices of Parallel Programming, Shenzhen, China. February 23, 2013.

[5] **"ACM SIGPLAN Workshop on Memory Systems Performance and Correctness (MSPC)"**
Workshop. Organizer, Program committee co-chair
co-located with Programming Languages Design and Implementation, Edinburgh, UK. June 13, 2014.

[6] **"2015 Midwest PL Summit"**
Workshop. Organizer.
West Lafayette, IN.
June 13, 2014.

WORKSHOPS/SHORT COURSES ATTENDED

[1] **CScADS Autotuning Workshop**
Snowbird, UT. July 2008

[2] **NSF Workshop on Deterministic Multiprocessing (WoDet)**
Seattle, WA. November 2009

[3] **DOE ASCR Workshop on Exascale Programming Challenges**
Marina del Rey, CA. July 2011

[4] **DOE Exascale Research Conference**
Washington, DC. September, 2012