

# Todd C. Mowry

## CURRICULUM VITAE

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### Contact Information

Computer Science Department  
Carnegie Mellon University  
5000 Forbes Avenue  
Pittsburgh, PA 15213

Phone: (412) 268-3725  
Fax: (412) 268-5576  
Email: [tcm@cs.cmu.edu](mailto:tcm@cs.cmu.edu)  
URL: <http://www.cs.cmu.edu/~tcm>

### Education

Ph.D. in Electrical Engineering, Stanford University, March 1994.

- Thesis: “Tolerating Latency Through Software-Controlled Data Prefetching.”
- Supervisors: Anoop Gupta and Monica Lam.

M.S. in Electrical Engineering, Stanford University, June 1989.

B.S. in Electrical Engineering with Highest Distinction, University of Virginia, May 1988.

### Academic Appointments

*7/08–Present*: Professor, Computer Science Department (with a courtesy appointment in the Department of Electrical and Computer Engineering), Carnegie Mellon University.

*8/09–6/10*: Associate Department Head for Faculty, Computer Science Department

*6/15–Present*: Director of the Ph.D. program, Computer Science Department

*7/97–6/08*: Associate Professor, Computer Science Department (with a courtesy appointment in the Department of Electrical and Computer Engineering), Carnegie Mellon University.

*12/93–6/97*: Assistant Professor, Department of Electrical and Computer Engineering (with a courtesy appointment in the Department of Computer Science), University of Toronto.

*9/89–11/93*: Graduate Research Assistant, Stanford University.

### Honors and Awards

- ASPLOS Influential Paper Award, 2022 (for “Design and Evaluation of a Compiler Algorithm for Prefetching,” from ASPLOS 1992).
- Best Paper Runner-Up Award, VLDB conference, 2018.
- ACM Fellow, for contributions to software prefetching and thread-level speculation, 2016.
- SCS Doctoral Dissertation Award co-won by Angela Demke Brown (Ph.D. advisee), 2005.
- Most Thought-Provoking Idea Award (for Claytronics), the Wild and Crazy Idea Session IV held at ASPLOS-XI, 2004.
- Best Paper Award, the 20th International Conference on Data Engineering (ICDE), 2004.
- SCS Doctoral Dissertation Award co-won by J. Gregory Steffan (Ph.D. advisee), 2003.
- Runner-Up for Best Paper Award, the ACM SIGMOD Conference, 2001.
- Alfred P. Sloan Research Fellow, 1999-2001.
- TR100 Award (awarded by MIT’s Technology Review magazine to the top 100 most promising young innovators in science and technology), 1999.
- Best Paper Award, the Second Symposium on Operating Systems Design and Implementation, 1996.

## Doctoral Thesis Supervision

Student	Thesis Title (or Topic)	Graduation Date
Chi-Keung Luk	Optimizing the Cache Performance of Non-Numeric Applications. <i>(Nominated for the ACM Thesis Award by the University of Toronto Department of Computer Science.)</i>	January, 2000
J. Gregory Steffan	Hardware Support for Thread-Level Speculation. <i>(Co-winner of the SCS Doctoral Dissertation Award.)</i>	April, 2003
Antonia Zhai	Compiler Optimization of Value Communication for Thread-Level Speculation.	January, 2005
Angela Demke Brown	Explicit Compiler-based Memory Management for Out-of-core Applications. <i>(Co-winner of the SCS Doctoral Dissertation Award.)</i>	May, 2005
Christopher Colohan	Applying Thread-Level Speculation to Database Transactions.	November, 2005
Shimin Chen	Redesigning Database Systems in Light of CPU Cache Prefetching.	December, 2005
Amit Manjhi	Increasing the Scalability of Dynamic Web Applications	March, 2008
Olatunji Ruwase	Improving Device Driver Reliability Through Decoupled Dynamic Binary Analysis	May, 2013
Michelle Goodstein	Dataflow Analysis-Based Dynamic Parallel Monitoring	August, 2014
Vivek Seshadri	Simple DRAM and Virtual Memory Abstractions to Enable Highly Efficient Memory Subsystems	May, 2016
Gennady Pekhimenko	Practical Data Compression for Modern Memory Hierarchies	July, 2016
Chris Fallin	Finding and Exploiting Parallelism with Data-Structure-Aware Static and Dynamic Analysis	February, 2019
Prashanth Menon	On Building Robustness into Compilation-Based Main-Memory Database Query Engines	May, 2021
Pratik Fegade	Auto-batching Techniques for Dynamic Deep Learning Computations	January, 2023
Ziqi Wang	Building a More Efficient Cache Hierarchy by Supporting Multiversioning and Leveraging Application-Level Information	January, 2023
Sam Arch	Unifying Declarative and Non-Declarative Code in Relational Database Management Systems	June, 2027 <i>(expected)</i>
Hongyi Jin	Compiler Optimizations for Machine Learning Applications	June, 2027 <i>(expected)</i>
Ruihang Lai	Compiler Optimizations for Machine Learning Applications	June, 2027 <i>(expected)</i>
Patrick Coppock	OS Support for Machine Learning Applications	June, 2027 <i>(expected)</i>

## Publications

### Book Chapters

1. Amir Yazdanbakhsh, Gennady Pekhimenko, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. Towards Breaking the Memory Bandwidth Wall Using Approximate Value Prediction. In *Approximate Circuits: Methodologies and CAD*, Springer International Publishing, 2019, pages 417–441.

### Refereed Journal Articles

1. Mishra, Deepanjali, Konstantinos Kanellopoulos, Ashish Panwar, Akshitha Sriraman, Vivek Seshadri, Onur Mutlu, and Todd C. Mowry. Address Scaling: Architectural Support for Fine-Grained Thread-Safe Metadata Management. In *IEEE Computer Architecture Letters*, 23(01), January 2024.
2. Prashanth Menon, Amadou Ngom, Lin Ma, Todd C. Mowry, and Andrew Pavlo. Permutable Compiled Queries: Dynamically Adapting Compiled Queries without Recompiling. In *Proceedings of the VLDB Endowment*, 14(2):101-113, October 2020.
3. Amir Yazdanbakhsh, Gennady Pekhimenko, Bradley Thwaites, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. RFVP: Rollback-Free Value Prediction with Safe-to-Approximate Loads. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 12(4):62, February 2016.
4. Amir Yazdanbakhsh, Gennady Pekhimenko, Bradley Thwaites, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. Mitigating the Memory Bottleneck with Approximate Load Value Prediction. In *IEEE Design and Test*, 33(1), January 2016.
5. Vivek Seshadri, Samihan Yedkar, Hongyi Xin, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Mitigating Prefetcher-Caused Pollution Using Informed Caching Policies for Prefetched Blocks. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 11(4), January 2015.
6. Shimin Chen, Phillip B. Gibbons, Michael Kozuch, and Todd C. Mowry. Log-Based Architectures: Using Multicore to Help Software Behave Correctly. In *Operating Systems Review*, 45(1), January 2011.
7. Shimin Chen, Michael Kozuch, Phillip B. Gibbons, Michael Ryan, Theodoros Strigkos, Todd C. Mowry, Olatunji Ruwase, Evangelos Vlachos, Babak Falsafi, and Vijaya Ramachandran. Flexible Hardware Acceleration for Instruction-Grain Lifeguards. In *IEEE Micro (Top Picks from 2008 Computer Architecture Conferences)*, 29(1), January 2009.
8. Seth C. Goldstein, Todd C. Mowry, Jason D. Campbell, Michael P. Ashley-Rollman, Michael De Rosa, Stanislav Funiak, James F. Hoburg, Mustafa E. Karagozler, Brian Kirby, Peter Lee, Padmanabhan Pillai, J. Robert Reid, Daniel D. Stancil, and Michael P. Weller. Beyond Audio and Video: Using Claytronics to Enable Pario. In *AI Magazine*, 30(2), March 2009.
9. Antonia Zhai, J. Gregory Steffan, Christopher B. Colohan, and Todd C. Mowry. Compiler and Hardware Support for Reducing the Synchronization of Speculative Threads. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 5(1), May 2008.
10. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Incrementally parallelizing database transactions with thread-level speculation. In *ACM Transactions on Computer Systems (TOCS)*, 26(1), February 2008.
11. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Improving Hash Join Performance through Prefetching. In *ACM Transactions on Database Systems*, 32(3):1-32, September 2007.

12. Christopher B. Colohan, Anastasia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. CMP Support for Large and Dependent Speculative Threads. In *IEEE Transactions on Parallel and Distributed Systems*, 18(8):1041-1054, August 2007.
13. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. The STAMPede Approach to Thread-Level Speculation. In *ACM Transactions on Computer Systems*, 23(3):253-300, August 2005.
14. Seth Copen Goldstein, Jason Campbell and Todd C. Mowry. Programmable Matter. In *IEEE Computer*, 38(6):99-101, June 2005.
15. Angela Demke Brown, Todd C. Mowry and Orran Krieger. Compiler-Based I/O Prefetching for Out-of-Core Applications. In *ACM Transactions on Computer Systems*, 19(2):111-170, May 2001.
16. Chi-Keung Luk and Todd C. Mowry. Architectural and Compiler Support for Effective Instruction Prefetching: A Cooperative Approach. In *ACM Transactions on Computer Systems*, 19(1):71-109, February 2001.
17. Todd C. Mowry and Chi-Keung Luk. Understanding Why Correlation Profiling Improves the Predictability of Data Cache Misses in Nonnumeric Applications. In *IEEE Transactions on Computers*, 49(4), April 2000.
18. Chi-Keung Luk and Todd C. Mowry. Automatic Compiler-Inserted Prefetching for Pointer-Based Applications. In *IEEE Transactions on Computers*, 48(2), February 1999.
19. Mark Horowitz, Margaret Martonosi, Todd C. Mowry, and Michael D. Smith. Informing Memory Operations: Memory Performance Feedback Mechanisms and their Applications. In *ACM Transactions on Computer Systems*, 16(2):170-205, May 1998.
20. Todd C. Mowry. Tolerating Latency in Multiprocessors through Compiler-Inserted Prefetching. In *ACM Transactions on Computer Systems*, 16(1):55-92, February 1998.
21. Todd Mowry and Anoop Gupta. Tolerating Latency Through Software-Controlled Prefetching in Shared-Memory Multiprocessors. In *Journal of Parallel and Distributed Computing*, 12(2):87-106, 1991.

#### Refereed Conference Papers

1. Fegade, Pratik, Tianqi Chen, Phillip Gibbons, and Todd Mowry. ACROBAT: Optimizing Auto-batching of Dynamic Deep Learning at Compile Time. In *Proceedings of the Sixth Conference on Machine Learning and Systems (MLSys)*, May 2024.
2. Kai Franz, Samuel Arch, Denis Hirn, Torsten Grust, Todd C. Mowry, and Andrew Pavlo. Dear User-Defined Functions, Inlining Isn't Working Out So Great For Us. Let's Try Batching To Make Our Relationship Work. Sincerely, SQL. To appear in *Proceedings of the 2024 Conference on Innovative Data Systems Research (CIDR)*, January 2024.
3. Wang, Ziqi, Kaiyang Zhao, Pei Li, Andrew Jacob, Michael Kozuch, Todd Mowry, and Dimitrios Skarlatos. Memento: Architectural Support for Ephemeral Memory Management in Serverless Environments. In *Proceedings of the 56th Annual IEEE/ACM International Symposium on Microarchitecture (Micro)*, October 2023.
4. Siyuan Chen, Pratik Pramod Fegade, Phillip Gibbons, Todd C. Mowry, and Tianqi Chen. ED-Batch: Efficient Automatic Batching of Dynamic Neural Networks via Learned Finite State Machines. In *Proceedings of the Fortieth International Conference on Machine Learning (ICML 2023)*, July 2023.
5. Graham Gobieski, Souradip Ghosh, Marijn Heule, Todd C. Mowry, Tony Nowatzki, Nathan Beckmann, and Brandon Lucia. Riptide: A programmable, energy-minimal dataflow compiler and architecture. In *Proceedings of the 2022 55th IEEE/ACM International Symposium on Microarchitecture (MICRO)*, October 2022.

6. Pratik Fegade, Tianqi Chen, Phillip Gibbons, and Todd C. Mowry. The CoRa Tensor Compiler: Compilation for Ragged Tensors with Minimal Padding. In *Proceedings of the Fifth Conference on Machine Learning and Systems (MLSys)*, August 2022.
7. Amadou Ngom, Prashanth Menon, Matthew Butrovich, Lin Ma, Wan Shen Lim, Todd C. Mowry, and Andrew Pavlo. Filter Representation in Vectorized Query Execution. In *Proceedings of the 17th International Workshop on Data Management on New Hardware (DaMoN)*, June 2021.
8. Ziqi Wang, Chul-Hwan Choo, Michael A. Kozuch, Todd C. Mowry, Gennady Pekhimenko, Vivek Seshadri, and Dimitrios Skarlatos. NVOverlay: Enabling Efficient and Scalable High-Frequency Snapshotting to NVM. In *Proceedings of the 48th Annual International Symposium on Computer Architecture (ISCA)*, June 2021.
9. Pratik Fegade, Tianqi Chen, Phillip Gibbons, and Todd C. Mowry. Cortex: A Compiler for Recursive Deep Learning Models. In *Proceedings of the Fourth Conference on Machine Learning and Systems (MLSys)*, April 2021.
10. Daming D. Chen, Phillip B. Gibbons, and Todd C. Mowry. TardisTM: Incremental Repair for Transactional Memory. In *Proceedings of the Eleventh International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM '20)*, February 2020.
11. Ziqi Wang, Michael A. Kozuch, Todd C. Mowry, and Vivek Seshadri. Multiversed Page Overlays: Enabling Faster Serializable Hardware Transactional Memory. In *Proceedings of the 28th International Conference on Parallel Architectures and Compilation Techniques (PACT)*, September 2019.
12. Vivek Seshadri, Donghyuk Lee, Thomas Mullins, Hasan Hassan, Amirali Boroumand, Jeremie Kim, Michael A. Kozuch, Onur Mutlu, Phillip B. Gibbons, and Todd C. Mowry. Ambit: in-memory accelerator for bulk bitwise operations using commodity DRAM technology. In *Proceedings of the 50th Annual International Symposium on Microarchitecture (MICRO-50)*, October 2017.
13. Prashanth Menon, Andrew Pavlo, and Todd C. Mowry. Relaxed Operator Fusion for In-Memory Databases: Making Compilation, Vectorization, and Prefetching Work Together At Last. In *Proceedings of VLDB 11(1): 1-13*, September 2017.
14. Andrew Pavlo, Gustavo Angulo, Joy Arulraj, Haibin Lin, Jiexi Lin, Lin Ma, Prashanth Menon, Todd Mowry, Matthew Perron, Ian Quah, Siddharth Santurkar, Anthony Tomasic, Skye Toor, Dana Van Aken, Ziqi Wang, Yingjun Wu, Ran Xian, and Tieying Zhang. Self-Driving Database Management Systems” In *Proceedings of the 2017 Conference on Innovative Data Systems Research (CIDR)*, January 2017.
15. Gennady Pekhimenko, Evgeny Bolotin, Nandita Vijaykumar, Onur Mutlu, Todd C. Mowry, and Stephen W. Keckler. A Case for Toggle-Aware Compression for GPU Systems. In *Proceedings of the 22nd International Symposium on High-Performance Computer Architecture (HPCA)*, March 2016.
16. Michelle L. Goodstein, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Tracking and Reducing Uncertainty in Dataflow Analysis-Based Dynamic Parallel Monitoring. In *Proceedings of the 2015 International Conference on Parallel Architectures and Compilation Techniques (PACT '15)*, October 2015.
17. Nandita Vijaykumar, Gennady Pekhimenko, Adwait Jog, Abhishek Bhowmick, Rachata Ausavarungnirun, Chita Das, Mahmut Kandemir, Todd C. Mowry, and Onur Mutlu. A Case for Core-Assisted Bottleneck Acceleration in GPUs: Enabling Efficient Data Compression. In *Proceedings of the 42nd Annual International Symposium on Computer Architecture (ISCA)*, June 2015.
18. Vivek Seshadri, Gennady Pekhimenko, Olatunji Ruwase, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, Todd C. Mowry, and Trishul Chilimbi. Page Overlays: An Enhanced

- Virtual Memory Framework to Enable Fine-grained Memory Management. In *Proceedings of the 42nd Annual International Symposium on Computer Architecture (ISCA)*, June 2015.
19. Gennady Pekhimenko, Tyler Huberty, Rui Cai, Onur Mutlu, Phillip P. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Exploiting Compressed Block Size as an Indicator of Future Reuse. In *Proceedings of the 21st International Symposium on High-Performance Computer Architecture (HPCA)*, February 2015.
  20. Vivek Seshadri, Abhishek Bhowmick, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. The Dirty-Block Index. In *Proceedings of the 41st Annual International Symposium on Computer Architecture (ISCA)*, June 2014.
  21. Olatunji Ruwase, Michael A. Kozuch, Phillip B. Gibbons, and Todd C. Mowry. Guardrail: High Fidelity Correctness Checking of Device Drivers for Safeguarding I/O Operations. In *Proceedings of the Nineteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2014)*, March 2014.
  22. Gennady Pekhimenko, Vivek Seshadri, Yoongu Kim, Hongyi Xin, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Linearly Compressed Pages: A Low-Complexity, Low-Latency Main Memory Compression Framework. In *Proceedings of the 46th Annual International Symposium on Microarchitecture (MICRO-46)*, December 2013.
  23. Vivek Seshadri, Yoongu Kim, Chris Fallin, Donghyuk Lee, Rachata Ausavarungnirun, Gennady Pekhimenko, Yixin Luo, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. RowClone: Fast and Energy-Efficient In-DRAM Bulk Data Copy and Initialization. In *Proceedings of the 46th Annual International Symposium on Microarchitecture (MICRO-46)*, December 2013.
  24. Michelle L. Goodstein, Shimin Chen, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Chrysalis Analysis: Incorporating Synchronization Arcs in Dataflow-Analysis-based Parallel Monitoring. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
  25. Vivek Seshadri, Onur Mutlu, Todd C. Mowry, and Michael A. Kozuch. The Evicted-Address Filter: A Unified Mechanism to Address Both Cache Pollution and Thrashing. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
  26. Gennady Pekhimenko, Vivek Seshadri, Onur Mutlu, Todd C. Mowry, Phillip B. Gibbons, and Michael A. Kozuch. Base-Delta-Immediate Compression: A Practical Data Compression Mechanism for On-Chip Caches. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
  27. Olatunji Ruwase, Shimin Chen, Phillip Gibbons, and Todd C. Mowry. Decoupled Lifeguards: Enabling Path Optimizations for Dynamic Correctness Checking Tools. In *Proceedings of the ACM SIGPLAN 2010 Conference on Programming Language Design and Implementation (PLDI)*, June 2010.
  28. F. Ryan Johnson, Radu Stoica, Anastasia Ailamaki, and Todd C. Mowry. Decoupling Contention Management from Scheduling. In *Proceedings of the Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.
  29. Michelle Goodstein, Evangelos Vlachos, Shimin Chen, Phillip B. Gibbons, Michael Kozuch, and Todd C. Mowry. Butterfly Analysis: Adapting Dataflow Analysis to Dynamic Parallel Monitoring. In *Proceedings of the Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.
  30. Evangelos Vlachos, Michelle Goodstein, Michael Kozuch, Shimin Chen, Babak Falsafi, Phillip B. Gibbons, and Todd C. Mowry. ParaLog: Enabling and Accelerating Online Parallel Monitoring of Multithreaded Applications. In *Proceedings of the Fifteenth International Conference*

*on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.

31. Amit Manjhi, Charles Garrod, Bruce M. Maggs, Todd C. Mowry, Anthony Tomasic. Holistic Query Transformations for Dynamic Web Applications. In *Proceedings of the 2009 IEEE 25th International Conference on Data Engineering (ICDE)*, March-April 2009.
32. Daniel J. Dewey, Michael P. Ashley-Rollman, Michael DeRosa, Seth Copen Goldstein, Todd C. Mowry, Siddhartha S. Srinivasa, Padmanabhan Pillai, and Jason Campbell. Generalizing metamodules to simplify planning in modular robotic systems. In *Proceedings of the IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems (IROS)*, September 2008.
33. Charles Garrod, Amit Manjhi, Anastasia Ailamaki, Bruce Maggs, Todd Mowry, Christopher Olston, and Anthony Tomasic. Scalable Query Result Caching for Web Applications. In *Proceedings of the 34th International Conference on Very Large Databases (VLDB)*, August 2008.
34. Lei Li, Wenjie Fu, Fan Guo, Todd C. Mowry, and Christos Faloutsos. Cut-and-stitch: efficient parallel learning of linear dynamical systems on SMPs. In *Proceedings of the 14th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, August 2008.
35. Shimin Chen, Michael Kozuch, Theodoros Strigkos, Babak Falsafi, Phillip B. Gibbons, Todd C. Mowry, Michael Ryan, Olatunji Ruwase, and Evangelos Vlachos. Flexible Hardware Acceleration for Instruction-Grain Program Monitoring. In *Proceedings of the 35th Annual International Symposium on Computer Architecture (ISCA)*, June 2008.
36. Olatunji Ruwase, Phillip B. Gibbons, Todd C. Mowry, Vijaya Ramachandran, Shimin Chen, Michael Kozuch, and Michael Ryan. Parallelizing dynamic information flow tracking. In *Proceedings of the 20th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, June 2008.
37. Brian Kirby, Burak Aksak, James Hoburg, Todd C. Mowry, and Padmanabhan Pillai. A Modular Robotic System Using Magnetic Force Effectors. In *Proceedings of the IEEE/RSJ 2007 International Conference on Intelligent Robots and Systems (IROS)*, October 2007.
38. Michael Ashley-Rollman, Seth Goldstein, Peter Lee, Todd C. Mowry, and Padmanabhan Pillai. Meld: A Declarative Approach to Programming Ensembles. In *Proceedings of the IEEE/RSJ 2007 International Conference on Intelligent Robots and Systems (IROS)*, October 2007.
39. Amit Manjhi, Phillip B. Gibbons, Anastassia Ailamaki, Charles Garrod, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, Anthony Tomasic, and Haifeng Yu. Invalidation Clues for Database Scalability Services. In *Proceedings of the 2007 IEEE 23rd International Conference on Data Engineering (ICDE)*, pages 316-325, April 2007.
40. Michael De Rosa, Peter Lee, Seth Goldstein, Jason Campbell, Padmanabhan Pillai, and Todd C. Mowry. Distributed Watchpoints: Debugging Large Multi-Robot Systems. In *Proceedings of the 2007 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3723-3729, April 2007.
41. Benjamin D. Rister, Jason Campbell, Padmanabhan Pillai, and Todd C. Mowry. Integrated Debugging of Large Modular Robot Ensembles. In *Proceedings of the 2007 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2227-2234, April 2007.
42. Shimin Chen, Phillip Gibbons, Michael Kozuch, Vasileios Liaskovitis, Anastassia Ailamaki, Guy Blelloch, Babak Falsafi, Limor Fix, Nikos Hardavellas, Todd C. Mowry and Chris Wilkerson. Scheduling Threads for Constructive Cache Sharing on CMPs. In *Proceedings of 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 105-115, June 2007.
43. Shimin Chen, Babak Falsafi, Phillip B. Gibbons, Michael Kozuch, Todd C. Mowry, Radu Teodorescu, Anastassia Ailamaki, Limor Fix, Gregory R. Ganger, Bin Lin, and Steven W. Schlosser. Log-Based Architectures for General-Purpose Monitoring of Deployed Code. In

*Proceedings of the Workshop on Architectural and System Support for Improving Software Dependability (ASID), held with ASPLOS XII, October 2006.*

44. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Tolerating Dependencies Between Large Speculative Threads Via Sub-Threads. In *Proceedings of the 33rd Annual International Symposium on Computer Architecture (ISCA)*, pages 216-226, June 2006.
45. Amit Manjhi, Anastassia Ailamaki, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, and Anthony Tomasic. Simultaneous Scalability and Security for Data-Intensive Web Applications. In *Proceedings of the 2006 ACM SIGMOD International Conference on Management of Data*, pages 241-252, June 2006.
46. Vasileios Liaskovitis, Shimin Chen, Phillip B. Gibbons, Anastassia Ailamaki, Guy E. Blelloch, Babak Falsafi, Limor Fix, Nikos Hardavellas, Michael Kozuch, Todd C. Mowry, and Chris Wilkerson. Parallel Depth First vs. Work Stealing Schedulers on CMP Architectures. In *Proceedings of 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, August 2006.
47. Brian Kirby, Jason Campbell, Burak Aksak, Padmanabhan Pillai, James F. Hoburg, Todd C. Mowry, and Seth Copen Goldstein. Catoms: Moving Robots without Moving Parts. In *Proceedings of the Twentieth National Conference on Artificial Intelligence (AAAI)*, pages 1730-1731, July 2005.
48. Christopher Olston, Amit Manjhi, Charles Garrod, Anastassia Ailamaki, Bruce M. Maggs, and Todd C. Mowry. A Scalability Service for Dynamic Web Applications. In *Proceedings of the Second Biennial Conference on Innovative Data Systems Research (CIDR)*, pages 56-69, January 2005.
49. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Optimistic Intra-Transaction Parallelism on Chip Multiprocessors. In *Proceedings of the 31st International Conference on Very Large Data Bases (VLDB)*, pages 73-84, September 2005.
50. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Inspector Joins. In *Proceedings of the 31st International Conference on Very Large Data Bases (VLDB)*, pages 817-828, September 2005.
51. Antonia Zhai, Christopher B. Colohan, J. Gregory Steffan, and Todd C. Mowry. Compiler Optimization of Memory-Resident Value Communication Between Speculative Threads. In *Proceedings of the 2007 International Symposium on Code Generation and Optimization (CGO)*, pages 39-52, March 2004.
52. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons and Todd C. Mowry. Improving Hash Join Performance through Prefetching. In *Proceedings of the 20th International Conference on Data Engineering (ICDE)*, pages 116-127, April 2004. (*This paper received the Best Paper Award.*)
53. Antonia Zhai, Christopher B. Colohan, J. Gregory Steffan and Todd C. Mowry. Compiler Optimization of Scalar Value Communication Between Speculative Threads. In *Proceedings of the Tenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-X)*, October 2002.
54. Shimin Chen, Philip B. Gibbons, Todd C. Mowry and Gary Valentin. Fractal Prefetching B+-Trees: Optimizing Both Cache and Disk Performance. In *Proceedings of the 2002 ACM SIGMOD International Conference on Management of Data*, June 2002.
55. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. Improving Value Communication for Thread-Level Speculation. In *Proceedings of the Eighth International Symposium on High-Performance Computer Architecture (HPCA)*, February 2002.

56. Shimin Chen, Philip B. Gibbons and Todd C. Mowry. Improving Index Performance through Prefetching. In *Proceedings of the 2001 ACM SIGMOD International Conference on Management of Data*, pages 235-246, May 2001. (*This paper received the Runner-Up for Best Paper Award.*)
57. Angela Demke Brown and Todd C. Mowry. Taming the Memory Hogs: Using Compiler-Inserted Releases to Manage Physical Memory Intelligently. In *Proceedings of the Fourth Symposium on Operating Systems Design and Implementation (OSDI 2000)*, pages 31-44, October 2000.
58. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. A Scalable Approach to Thread- Level Speculation. In *Proceedings of the 27th Annual International Symposium on Computer Architecture*, pages 1-12, June 2000.
59. Todd C. Mowry and Sherwyn R. Ramkisson. Software-Controlled Multithreading Using Informing Memory Operations. In *Proceedings of the Sixth International Symposium on High-Performance Computer Architecture*, January, 2000.
60. Chi-Keung Luk and Todd C. Mowry. Memory Forwarding: Enabling Aggressive Layout Optimizations by Guaranteeing the Safety of Data Relocation. In *Proceedings of the 26th Annual International Symposium on Computer Architecture (ISCA)*, pages 88-99, May 1999.
61. Chi-Keung Luk and Todd C. Mowry. Cooperative Prefetching: Compiler and Hardware Support for Effective Instruction Prefetching in Modern Microprocessors. In *Proceedings of the 31st Annual International Symposium on Microarchitecture*, pages 182-193, December 1998.
62. J. Gregory Steffan and Todd C. Mowry. The Potential for Using Thread-Level Data Speculation to Facilitate Automatic Parallelization. In *Proceedings of the Fourth International Symposium on High-Performance Computer Architecture*, pages 2-13, February, 1998.
63. Charles Chan, Adley Lo, and Todd C. Mowry. Comparative Evaluation of Latency Tolerance Techniques for Software Distributed Shared Memory. In *Proceedings of the Fourth International Symposium on High-Performance Computer Architecture*, pages 300-311, February, 1998.
64. Todd C. Mowry and Chi-Keung Luk. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. In *Proceedings of the 30th Annual International Symposium on Microarchitecture*, pages 314-320, December 1997.
65. Todd C. Mowry, Angela K. Demke and Orran Krieger. Automatic Compiler-Inserted I/O Prefetching for Out-of-Core Applications. In *Proceedings of the Second Symposium on Operating Systems Design and Implementation (OSDI '96)*, pages 3-17, October 1996. (*This paper received the Best Paper Award.*)
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- Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Supporting Large Speculative Threads for Databases and Beyond. Carnegie Mellon University Technical Report CMU-CS-05-109, July 2005.
- Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Optimistic Intra-Transaction Parallelism on Chip Multiprocessors. Carnegie Mellon University Technical Report CMU-CS-05-118, March 2005.
- Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Improving Hash Join Performance through Prefetching. Carnegie Mellon University Technical Report CMU-CS-03-157, October 2003.
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- Spiros Papadimitriou and Todd C. Mowry. Exploring Thread-Level Speculation in Software: The Effects of Memory Access Tracking Granularity. Carnegie Mellon University Technical Report CMU-CS-01-145, July 2001.
- Shimin Chen, Phillip B. Gibbons and Todd C. Mowry. Improving Index Performance through Prefetching. Carnegie Mellon University Technical Report CMU-CS-00-177, December 2000.
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- J. Gregory Steffan, Christopher B. Colohan and Todd C. Mowry. Architectural Support for Thread-Level Data Speculation. Carnegie Mellon University Technical Report CMU-CS-97-188, November 1997.
- Todd C. Mowry and Chi-Keung Luk. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. Carnegie Mellon University Technical Report CMU-CS-97-175, September 1997.
- J. Gregory Steffan and Todd C. Mowry. The Potential for Thread-Level Data Speculation in Tightly-Coupled Multiprocessors. University of Toronto Technical Report CSRI-TR-350, February 1997.
- Chi-Keung Luk and Todd C. Mowry. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. University of Toronto Technical Report CSRI-TR-359, February, 1997.
- Mark Horowitz, Margaret Martonosi, Todd C. Mowry, and Michael D. Smith. Informing Loads: Enabling Software to Observe and React to Memory Behavior. Stanford University Technical Report CSL-TR-95-673, July 1995.
- Todd C. Mowry. Tolerating Latency Through Software-Controlled Data Prefetching. Technical Report CSL-TR-94-628, Stanford University, June 1994.

#### Patents Held

- Todd C. Mowry. U.S. Patent 7,127,586: Prefetching hints. Issued October, 2006.
- Shimin Chen, Phillip B. Gibbons, and Todd C. Mowry. U.S. Patent 6,772,179: System and method for improving index performance through prefetching. Issued August, 2004.
- Todd C. Mowry. U.S. Patent 6,240,488: Prefetching hints. Issued May, 2001.
- Todd C. Mowry. U.S. Patent 5,732,242: Consistently specifying way destinations through prefetching hints. Issued March, 1998.
- Todd C. Mowry and Earl A. Killian. U.S. Patent 5,696,958: Method and apparatus for reducing delays following the execution of a branch instruction in an instruction pipeline. Issued December, 1997.

#### Distinguished Lectures

- 9/25/13: *“The Log-Based Architectures Project: Exploiting Multicore to Help Parallel Software Behave Correctly”*, University of Wisconsin-Madison, Department of Computer Science, Distinguished Lecture Series.
- 2/7/08: *“Pario: the Next Step Beyond Audio and Video”*, University of Toronto, Department of Electrical and Computer Engineering Distinguished Lecture Series.

## **Professional Activities**

### **Professional Societies**

- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of the Association of Computing Machinery (ACM)

### **Industrial Employment**

*5/04–6/07*: Intel Corporation, Pittsburgh, Pennsylvania: Director of the Intel Research Pittsburgh Lab.

*6/89–11/93*: Silicon Graphics, Inc., Mountain View, California (formerly MIPS Computer Systems, Sunnyvale California): Computer Architect (part-time).

### **Consulting**

*7/07–2/11*: Intel Corporation, Pittsburgh, Pennsylvania: Research Advisor.

*8/96–4/04*: SandCraft, Inc., Santa Clara, California: Member of the Technical Advisory Board.

*1/96–4/04*: IBM, Toronto: Visiting Scientist.

*12/93–12/96*: Silicon Graphics, Inc., Mountain View, California: Computer Architecture Consultant.

## University Committee Work and Other Service Activities

### Committee Work

- Faculty Hiring Committees:
  - Computer Science Department: 2008, 2010.
  - Computer Systems Area: 2000, 2001, 2002, 2003, 2004.
- Chair of the Computer Science Department Head Selection Committee, 2007.
- CSD Ph.D. Admissions Committee, 2001, 2002, 2003.
- School of Computer Science Council, 2001-2004.
- Carnegie Mellon University Faculty Senate (Presidential Appointee), 2000-2001.
- Computer Systems Area Advocate, 2000-2004.
- Doctoral Review Committee, 1998-2004.
- ACM Thesis Award Nomination Committee, 1999.

### Journal, Conference and Workshop Organization

- Editor-in-Chief, ACM Transactions on Computer Systems, 2013-2018.
- Associate Editor, ACM Transactions on Computer Systems, 2001-2013.
- Program Chair of the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2011.
- Sponsorship Chair, International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010.
- Member of the ISCA program committee, 1998, 2000, and 2011.
- Member of the ASPLOS program committee, 2000, 2004.
- Member of the ASPLOS external review committee, 2012.
- Co-Program Chair of the International Conference on Parallel Architectures and Compilation Techniques (PACT), 2001.
- Member of the International Symposium on Microarchitecture program committee, 1998.
- Member of the Workshop on Architectural and System Support for Improving Software Dependability (ASID) program committee, 2005.
- Member of the Workshop on Memory System Performance (MSP) program committee (in conjunction with PLDI), 2002 and 2004.
- Member of the IBM CASCON program committee, 1995, 1996, 1997.
- Member of the First SUIF Workshop Program Committee, 1996.
- Organized the CASCON 97 workshop on Compiler Optimization, 1997.
- Initiated and organized the 1st Toronto / Rochester Workshop on Shared-Memory Multiprocessors, 1994.