

Michael F. Spear

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EDUCATION	University of Rochester , Rochester, New York USA Ph.D., Computer Science, August 2009 Dissertation Topic: “Fast Software Transactions” Advisor: Michael Scott M.S., Computer Science, December 2005 University of Alaska, Anchorage , Anchorage, Alaska USA Masters of Business Administration, May 2003 United States Military Academy , West Point, New York USA B.S., Computer Science, May 1999	
PROFESSIONAL EXPERIENCE	Lehigh University , Bethlehem, Pennsylvania USA Associate Professor, Computer Science and Engineering Assistant Professor, Computer Science and Engineering Intel , Santa Clara, California USA Contractor, Programming Systems Laboratory University of Rochester , Rochester, New York Research Assistant, Department of Computer Science IBM T.J. Watson Research Center , Yorktown Heights, New York Research Intern Microsoft Research , Redmond, Washington Research Intern, Operating Systems Group Little Rock Air Force Base , Little Rock, Arkansas Executive Officer, 314th Maintenance Group Ranks held: First Lieutenant, Captain. Elmendorf Air Force Base , Anchorage, Alaska Assistant Chief of Wing Programs, 3rd Wing Ranks held: Second Lieutenant, First Lieutenant.	(7/16 – Present) (8/09 – 6/16) (11/14 – 5/15) (8/04 – 7/09) (05/07 – 08/07) (06/05 – 08/05) (12/02 – 07/04) (06/99 – 11/02)
RESEARCH INTERESTS	Exploiting concurrency and simplifying the development of correct multithreaded applications. Current efforts focus on transactional memory, concurrent data structures, and programming languages.	
PUBLICATIONS	Book Chapters (1) 1. “Case Study: Using Transactions in Memcached”, by Michael Spear, Wenjia Ruan, Yujie Liu, and Trilok Vyas. In Rachid Guerraoui and Paolo Romano (Eds.), “Transactional Memory. Foundations, Algorithms, Tools, and Applications” (449–467). Springer International Publishing, 2015.	

Journal Publications (4)

1. “Transactional Read-Modify-Write Without Aborts”, by Wenjia Ruan, Yujie Liu, and Michael Spear. In *ACM Transactions on Architecture and Code Optimization* 11(4): 63.1–63.24, 2014.
2. “Boosting Timestamp-based Transactional Memory by Exploiting Hardware Cycle Counters”, by Wenjia Ruan, Yujie Liu, and Michael Spear. In *ACM Transactions on Architecture and Code Optimization* 10(4): 40.1–40.21, 2013.
3. “A Transactional Memory with Automatic Performance Tuning”, by Qingping Wang, Sameer Kulkarni, John Cavazos, and Michael Spear. In *ACM Transactions on Architecture and Code Optimization* 8(4): 54.1–54.23, 2012. Also appeared in proceedings of the 7th International Conference on High-Performance and Embedded Architectures and Compilers, Paris, France, January 2012.
4. “Compiler and Runtime Techniques for Software Transactional Memory Optimization”, by Peng Wu, Maged Michael, Christoph von Praun, Takuya Nakaike, Rajesh Bordawekar, Harold Cain, Calin Cascaval, Siddhartha Chatterjee, Stefanie Chiras, Rui Hou, Mark Mergen, Xiaowei Shen, Michael Spear, Huayong Wang, and Kun Wang. In *Concurrency and Computation: Practice and Experience* 21(1): 7-23, 2009.

Refereed Conference Proceedings (37)

1. “Extending Transactional Memory with Atomic Deferral”, by Tingzhe Zhou, Victor Luchangcok and Michael Spear. In *Proceedings of the 21st International Conference On Principles Of Distributed Systems (OPODIS)*, Lisboa, Portugal, December 2017.
2. “A Study of Unnecessary Write Backs”, by Chris Garman, Xiaochen Guo, and Michael Spear. In *Proceedings of the 2017 International Symposium on Memory Systems (MEMSYS)*, Washington, DC, October 2017.
3. “Redesigning Go’s Built-In Map to Support Concurrent Operations”, by Louis Jenkins, Tingzhe Zhou, and Michael Spear. In *Proceedings of the 26th International Conference on Parallel Architectures and Compilation Techniques (PACT)*, Portland, OR, September 2017.
4. “Practical Experience with Transactional Lock Elision”, by Tingzhe Zhou, PanteA Zardoshti, and Michael Spear. In *Proceedings of the 46th International Conference on Parallel Processing (ICPP)*, Bristol, UK, August 2017.
5. “Hand-Over-Hand Transactions with Precise Memory Reclamation”, by Tingzhe Zhou, Victor Luchangco, and Michael Spear. In *Proceedings of the 29th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Washington, DC, July 2017.
6. “Languages Must Expose Memory Heterogeneity”, by Xiaochen Guo, Aviral Shrivastava, Michael Spear, and Gang Tan. In *Proceedings of the 2016 International Symposium on Memory Systems (MEMSYS)*, Washington, DC, October 2016.
7. “Practical Condition Synchronization for Transactional Memory”, by Chao Wang and Michael Spear. In *Proceedings of the 11th European Conference on Computer Systems (EuroSys 2016)*, London, UK, April 2016.
8. “TSXProf: Profiling Hardware Transactions”, by Yujie Liu, Justin Gottschlich, Gilles Pokam, and Michael Spear. In *Proceedings of the 24th International Conference on Parallel Architectures and Compilation Techniques (PACT)*, San Francisco, CA, October 2015.
9. “Hybrid Transactional Memory Revisited”, by Wenjia Ruan and Michael Spear. In *Proceedings of the 29th International Symposium on Distributed Computing (DISC)*, Tokyo, Japan, October 2015.
10. “Transactional Acceleration of Concurrent Data Structures”, by Yujie Liu, Tingzhe Zhou, and Michael Spear. In *Proceedings of the 27th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Portland, OR, June 2015.

11. “Dynamic-Sized Nonblocking Hash Tables”, by Yujie Liu, Kunlong Zhang, and Michael Spear. In *Proceedings of the 33rd ACM Symposium on Principles of Distributed Computing (PODC)*, Paris, France, July 2014.
12. “Transaction-Friendly Condition Variables”, by Chao Wang, Yujie Liu, and Michael Spear. In *Proceedings of the 26th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Prague, Czech Republic, June 2014.
13. “Partitioning OWL Knowledge Bases for Parallel Reasoning”, by Sambhawa Priya, Yuanbo Guo, Michael Spear, and Jeff Heflin. In *Proceedings of the 8th IEEE International Conference on Semantic Computing (ICSC 2014)*, Newport Beach, CA, June 2014.
14. “Transactionalizing Legacy Code: an Experience Report Using GCC and Memcached”, by Wenjia Ruan, Trilok Vyas, Yujie Liu, and Michael Spear. In *Proceedings of the 19th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Salt Lake City, UT, March 2014.
15. “Practical Non-blocking Unordered Lists”, by Kunlong Zhang, Yujiao Zhao, Yajun Yang, Yujie Liu and Michael Spear. In *Proceedings of the 2013 International Symposium on Distributed Computing (DISC)*, Jerusalem, Israel, October 2013.
16. “Mindicators: A Scalable Approach to Quiescence”, by Yujie Liu, Victor Luchangco, and Michael Spear. In *Proceedings of the 33rd International Conference on Distributed Computing Systems*, Philadelphia, PA, July 2013.
17. “Read, Write, Play: An Educational Mobile Gaming Platform”, by Jennifer Bayzick, Bradley Askins, Sharon Kalafut, and Michael Spear. In *Proceedings of the 44th ACM Technical Symposium on Computer Science Education (SIGCSE 2013)*, Denver, CO, March 2013.
18. “On the Platform Specificity of STM Instrumentation Mechanisms”, by Wenjia Ruan, Yujie Liu, Chao Wang, and Michael Spear. In *Proceedings of the 2013 International Symposium on Code Generation (CGO)*, Shenzhen, China, February 2013.
19. “Mounds: Array-Based Concurrent Priority Queues”, by Yujie Liu and Michael Spear. In *Proceedings of the 41st International Conference on Parallel Processing (ICPP)*, Pittsburgh, PA, September 2012.
20. “Delegation and Nesting in Best Effort Hardware Transactional Memory”, by Yujie Liu, Stephan Diestelhorst, and Michael Spear. In *Proceedings of the 24th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Pittsburgh, PA, June 2012.
21. “Hybrid NOrec: A Case Study in the Effectiveness of Best Effort Hardware Transactional Memory”, by Luke Dalessandro, Francois Carouge, Sean White, Yossi Lev, Mark Moir, Michael Scott, and Michael Spear. In *Proceedings of the 16th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Newport Beach, CA, March 2011.
22. “A Scalable Lock-Free Universal Construction with Best Effort Transactional Hardware”, by Francois Carouge and Michael Spear. In *Proceedings of the 2010 International Symposium on Distributed Computing (DISC)*, Cambridge, MA, September 2010.
23. “Transactions as the Foundation of a Memory Consistency Model”, by Luke Dalessandro, Michael Scott, and Michael Spear. In *Proceedings of the 2010 International Symposium on Distributed Computing (DISC)*, Cambridge, MA, September 2010.
24. “Transactional Mutex Locks”, by Luke Dalessandro, Dave Dice, Michael Scott, Nir Shavit, and Michael Spear. In *Proceedings of the Euro-Par 2010 Conference (EuroPar 2010)*, Naples, Italy, August 2010.
25. “Robust, Lightweight Adaptivity for Software Transactional Memory”, by Michael Spear. In *Proceedings of the 22nd ACM Symposium on Parallelism in Algorithms*

- and Architectures (SPAA)*, Santorini, Greece, June 2010.
26. “NOrec: Streamlining STM by Abolishing Ownership Records”, by Luke Dalessandro, Michael Spear, and Michael Scott. In *Proceedings of the 15th ACM Symposium on Principles and Practice of Parallel Programming (PPoPP)*, Bangalore, India, January 2010.
 27. “Reducing Memory Ordering Overheads in Software Transactional Memory”, by Michael Spear, Maged Michael, Michael Scott, and Peng Wu. In *Proceedings of the 2009 International Symposium on Code Generation and Optimization (CGO)*, Seattle, WA, March 2009.
 28. “A Comprehensive Strategy for Contention Management in Software Transactional Memory”, by Michael Spear, Luke Dalessandro, Virendra Marathe, and Michael Scott. In *Proceedings of the 14th ACM Symposium on Principles and Practice of Parallel Programming (PPoPP)*, Raleigh, NC, February 2009.
 29. “Ordering-Based Semantics for Software Transactional Memory”, by Michael Spear, Luke Dalessandro, Virendra Marathe, and Michael Scott. In *Proceedings of the 12th International Conference On Principles Of Distributed Systems (OPODIS)*, Luxor, Egypt, December 2008.
 30. “Implementing and Exploiting Inevitability in Software Transactional Memory”, by Michael Spear, Michael Silverman, Luke Dalessandro, Maged Michael, and Michael Scott. In *Proceedings of the 37th International Conference on Parallel Processing (ICPP)*, Portland, OR, September 2008.
 31. “Scalable Techniques for Transparent Privatization in Software Transactional Memory”, by Virendra Marathe, Michael Spear, and Michael Scott. In *Proceedings of the 37th International Conference on Parallel Processing (ICPP)*, Portland, OR, September 2008.
 32. “RingSTM: Scalable Transactions with a Single Atomic Instruction”, by Michael Spear, Maged Michael and Christoph von Praun. In *Proceedings of the 20th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Munich, Germany, June 2008.
 33. “Delaunay Triangulation with Transactions and Barriers”, by Michael Scott, Michael Spear, Luke Dalessandro, and Virendra Marathe. In *Proceedings of the IEEE International Symposium on Workload Characterization (IISWC), Benchmarks track*, Boston, MA, September 2007.
 34. “An Integrated Hardware-Software Approach to Flexible Transactional Memory”, by Arrvindh Shriraman, Michael Spear, Hemayet Hossain, Virendra Marathe, Sandhya Dwarkadas, and Michael Scott. In *Proceedings of the 34th International Symposium on Computer Architecture (ISCA)*, San Diego, CA, June 2007. Earlier but expanded version available as *TR 910, Department of Computer Science, University of Rochester*, December 2006.
 35. “Nonblocking Transactions Without Indirection Using Alert-on-Update”, by Michael F. Spear, Arrvindh Shriraman, Luke Dalessandro, Sandhya Dwarkadas, and Michael L. Scott. In *Proceedings of the 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, San Diego, CA, June 2007.
 36. “Conflict Detection and Validation Strategies for Software Transactional Memory”, by Michael F. Spear, Virendra J. Marathe, William N. Scherer III, and Michael L. Scott. In *Proceedings of the 20th International Symposium on Distributed Computing (DISC)*, Stockholm, Sweden, September 2006.
 37. “Solving the Starting Problem: Device Drivers as Self-Describing Artifacts”, by Michael F. Spear, Tom Roeder, Orion Hodson, Galen Hunt, and Steven Levi. In *Proceedings of the EuroSys2006 Conference*, Leuven, Belgium, April 2006.

Refereed Workshop Proceedings (21)

1. “Practical Experience with Transactional Lock Elision”, by Tingzhe Zhou, Pantea Zardoshti, and Michael Spear. In *Proceedings of the 12th ACM SIGPLAN Work-*

- shop on Transactional Computing (TRANSACT)*, Austin, TX, February 2017.
2. “Towards Migrating Computation to Distributed Memory Caches”, by Adam Schaub and Michael Spear. In *Proceedings of the 2016 Workshop on Distributed Cloud Computing (DCC)*, Chicago, IL, July 2016.
 3. “The Mimir Approach to Transactional Output”, by Tingzhe Zhou and Michael Spear. In *Proceedings of the 11th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Barcelona, Spain, February 2016.
 4. “Between All and Nothing – Versatile Aborts in Hardware Transactional Memory” by Stephan Diestelhorst, Martin Nowack, Michael Spear, and Christof Fetzer. In *Proceedings of the 10th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Portland, OR, June 2015.
 5. “Transactional Tools for the Third Decade”, by Matthew Kilgore, Stephan Louie, Chao Wang, Tingzhe Zhou, Wenjia Ruan, Yujie Liu, and Michael Spear. In *Proceedings of the 10th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Portland, OR, June 2015.
 6. “An Opaque Hybrid Transactional Memory”, by Wenjia Ruan and Michael Spear. In *Proceedings of the 10th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Portland, OR, June 2015.
 7. “A New API For Transactional Condition Synchronization”, by Chao Wang, Yujie Liu, and Michael Spear. In *Proceedings of the 6th Workshop on the Theory of Transactional Memory (WTTM2014)*, Paris, France, July 2014.
 8. “Transaction-Safe Condition Variables”, by Chao Wang, Yujie Liu, and Michael Spear. In *Proceedings of the 9th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Salt Lake City, UT, March 2014.
 9. “STAMP Need Not Be Considered Harmful”, by Wenjia Ruan, Yujie Liu, and Michael Spear. In *Proceedings of the 9th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Salt Lake City, UT, March 2014.
 10. “On the Relationship Between Delaying Operators and Language-Level Semantics”, by Wenjia Ruan, Yujie Liu, and Michael Spear. In *Proceedings of the 5th Workshop on the Theory of Transactional Memory (WTTM2013)*, Jerusalem, Israel, October 2013.
 11. “Boosting Timestamp-based Transactional Memory by Exploiting Hardware Cycle Counters”, by Wenjia Ruan, Yujie Liu, and Michael Spear. In *Proceedings of the 8th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Houston, TX, March 2013.
 12. “Transactionalizing Legacy Code: An Experience Report Using GCC and Memcached”, by Trilok Vyas, Yujie Liu, and Michael Spear. In *Proceedings of the 8th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Houston, TX, March 2013. **Best Application Paper**
 13. “Toxic Transactions”, by Yujie Liu and Michael Spear. In *Proceedings of the 6th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, San Jose, CA, June 2011.
 14. “Towards Applying Machine Learning to Adaptive Transactional Memory”, by Qingping Wang, Sameer Kulkarni, John Cavazos, and Michael Spear. In *Proceedings of the 6th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, San Jose, CA, June 2011.
 15. “On Reconciling Hardware Atomicity, Memory Models, and `_tm_waiver`”, by Sean White and Michael Spear. In *Proceedings of the 2nd Workshop on the Theory of Transactional Memory (WTTM2010)*, Cambridge, MA, September 2010.
 16. “Fastpath Speculative Parallelization”, by Michael Spear, Kirk Kelsey, Tongxin Bai, Luke Dalessandro, Michael Scott, Chen Ding, and Peng. Wu. In *Proceedings of the 22nd International Workshop on Languages and Compilers for Parallel Computing (LCPC)*, Newark, DE, October 2009.
 17. “Transactional Mutex Locks”, by Michael Spear, Arrvindh Shriraman, Luke Da-

- lessandro, and Michael Scott. In *Proceedings of the 4th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Raleigh, NC, February 2009.
18. “Inevitability Mechanisms for Software Transactional Memory”, by Michael Spear, Maged Michael, and Michael Scott. In *Proceedings of the 3rd ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Salt Lake City, UT, February 2008.
 19. “Capabilities and Limitations of Library-Based Software Transactional Memory in C++”, by Luke Dalessandro, Virendra Marathe, Michael Spear, and Michael Scott. In *Proceedings of the 2nd ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Portland, OR, August 2007.
 20. “Lowering the Overhead of Software Transactional Memory”, by Virendra J. Marathe, Michael F. Spear, Christopher Heriot, Athul Acharya, David Eisenstat, William N. Scherer III, and Michael L. Scott. In *Proceedings of the 1st ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Ottawa, ON, Canada, June 2006. Earlier but expanded version available as *TR 893, Department of Computer Science, University of Rochester*, March 2006.
 21. “Hardware Acceleration of Software Transactional Memory”, by Arrvindh Shriraman, Virendra J. Marathe, Sandhya Dwarkadas, Michael L. Scott, David Eisenstat, Christopher Heriot, William N. Scherer III, and Michael F. Spear. In *Proceedings of the 1st ACM SIGPLAN Workshop on Transactional Computing (TRANSACT)*, Ottawa, ON, Canada, June 2006.

Refereed Brief Announcements and Posters (10)

1. “Extending Transactional Memory with Atomic Deferral (Brief Announcement)” by Tingzhe Zhou, Victor Luchangco, and Michael Spear. In *Proceedings of the 29th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Washington, DC, July 2017.
2. “Brief Announcement: Between All and Nothing — Versatile Aborts in Hardware Transactional Memory”, by Stephan Diestelhorst, Martin Nowack, Michael Spear and Christof Fetzer. In *Proceedings of the 25th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, Montreal, Canada, July 2013.
3. “A Lock-Free, Array-Based Priority Queue (POSTER)”, by Yujie Liu and Michael Spear. In *Proceedings of the 17th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, New Orleans, LA, February 2012.
4. “Brief Announcement: A Nonblocking Set Optimized for Querying the Minimum Value”, by Yujie Liu and Michael Spear. In *Proceedings of the 30th ACM Symposium on Principles of Distributed Computing (PODC)*, San Jose, CA, June 2011. Expanded version available as *TR LU-CSE-11-001, Computer Science and Engineering Department, Lehigh University*, May 2011.
5. “Hybrid TM Using Norec STM (POSTER)”, by Luke Dalessandro, Michael Spear, and Michael Scott. In *Proceedings of the 15th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Pittsburgh, PA, March 2010.
6. “Transactional Memory Retry Mechanisms (brief announcement)”, by Michael Spear, Andrew Sveikauskas, and Michael Scott. In *Proceedings of the 27th ACM Symposium on Principles of Distributed Computing (PODC)*, Toronto, ON, Canada, August 2008. Expanded version available as *TR 935, Department of Computer Science, University of Rochester*, June 2008.
7. “Transaction Safe Nonblocking Data Structures (brief announcement)”, by Virendra Marathe, Michael Spear and Michael Scott. In *Proceedings of the 21st International Symposium on Distributed Computing (DISC)*, Lemesos, Cyprus, September 2007.
8. “Privatization Techniques for Software Transactional Memory (brief announcement)”, by Michael Spear, Virendra Marathe, Luke Dalessandro, and Michael

- Scott. In *Proceedings of the 26th ACM Symposium on Principles of Distributed Computing (PODC)*, Portland, OR, August 2007. Expanded version available as *TR 915, Department of Computer Science, University of Rochester*, February 2007.
9. “Transactions and Privatization in Delaunay Triangulation (brief announcement)”, by Michael Scott, Michael Spear, Luke Dalessandro, and Virendra Marathe. In *Proceedings of the 26th ACM Symposium on Principles of Distributed Computing (PODC)*, Portland, OR, August 2007.
 10. “Alert-on-Update: A Communication Aid for Shared Memory Multiprocessors (poster paper)”, by Michael F. Spear, Arrvindh Shriraman, Hemayet Hossain, Sandhya Dwarkadas, and Michael L. Scott. In *Proceedings of the 12th ACM Symposium on Principles and Practice of Parallel Programming (PPoPP)*, San Jose, CA, March 2007.

Patents (2)

1. Michael Scott, Sandhya Dwarkadas, Arrvindh Shriraman, Virendra Marathe, and Michael Spear, “System and Method for Hardware Acceleration of a Software Transactional Memory”. US 8,180,971.
2. Galen C. Hunt, James R. Larus, Manuel A Fahndrich, Orion Hodson, David R. Tarditi, Michael Spear, Michael Carbin, Steven P. Levi, and Bjame Steensgaard, “Configuration of Isolated Extensions and Device Drivers”. US 8,074,231.

Patents Pending (2)

1. Christoph von Praun and Michael Spear, “Architectural Support for Software Thread-Level Speculation”.
2. Maged Michael, Michael Spear, and Christoph von Praun, “Managing Concurrent Transactions Using Bloom Filters”.

HONORS AND AWARDS

- Alfred Noble Robinson Faculty Award, Lehigh University, 2015
- TRANSACT Distinguished Service Award 2014
- Best Application Paper, TRANSACT 2013
- Ruth and Joel Spira Excellence in Teaching Award, Lutron Electronics, Inc., 2013
- P.C. Rossin Assistant Professorship, 2011-2013
- Outstanding Dissertation Award (Engineering), University of Rochester, 2010
- 3rd Wing Staff Officer of the Year, 2000
- U.S. Grant Award (top graduate in Computer Science at West Point), 1999
- USMA Distinguished Graduate, 1999

RESEARCH GRANTS

Competitively Awarded Research Grants

- (co-PI; PI is Brian Davison, Lehigh U.) National Science Foundation, “REU Site: Intelligent and Scalable Systems”. May 2018 – Apr 2021, \$359,969. CNS-1757787.
- (PI; co-PIs are Xiaochen Guo, Lehigh U., Gang Tan, Penn State, and Aviral Shrivastava, Arizona State) National Science Foundation, Computing and Communication Foundations, and Intel, “CAPA: Collaborative Research: Lightweight Abstract Memory Features”. Sep 2017 – Aug 2020, \$2,000,000 (Lehigh portion \$1,000,000). CCF-1723624.
- (PI) Oracle, “Exploiting Transactional Memory in Real Applications”. Mar 2016 – Feb 2017, \$75,000.
- (co-PI; PI is Robin Hojnoski, Lehigh U.) Lehigh University, “Building Technology to Understand and Support STEM Skills in Young Children”. Sep 2016 – Aug 2017, \$50,212.
- (PI) Comcast, “Migrating Computation in a Distributed In-Memory Cache”. Sept 2014 – Aug 2016, \$56,980.

- (PI) National Science Foundation, Computing and Communication Foundations, “CAREER: A Transactional Software Ecosystem”. Aug 2013 – Jul 2018, \$450,674. CCF-1253362.
- (co-PI; PI is John Cavazos, U. Delaware) National Science Foundation, Computing and Communication Foundations, “SHF:Small:Collaborative Research:Adaptive Automatic Parallelization”. Oct 2012 – Sept 2015, \$247,793 (\$500,000 total). CCF-1218530.
- (PI) Google, “Lock-Free Linux By Refinement”. Feb 2012 – Feb 2013, \$46,000.
- (PI) National Science Foundation, Computer and Network Systems, “CSR: Small: Adaptive Synchronization for Multicore Systems”. Aug 2010 – Jul 2013, \$250,025. CNS-1016828.

Other Grants

- Laboratory Enhancement Grant, P.C. Rossin College of Engineering and Applied Science, Lehigh University, 2015, \$32,000.
- Laboratory Enhancement Grant, P.C. Rossin College of Engineering and Applied Science, Lehigh University, 2014, \$87,000.
- (co-PI with Brian Chen, Edmund Web III) Faculty Research Grant, “Parallel Algorithms for Structural Analytics in Materials Science and Structural Biology”, Lehigh University, 2013, \$6,000.
- Core Competencies Grant, “Support for mobiLEHIGH”. Lehigh University, 2013, \$2,500.
- Laboratory Enhancement Grant, P.C. Rossin College of Engineering and Applied Science, Lehigh University, 2011, \$66,000.
- (PI) National Science Foundation, Computing and Communication Foundations, “Student Travel Support for the 16th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (PPoPP 2011)”. Jul 2010 – Jun 2011, \$10,000. CCF-1044312.

PROFESSIONAL PRESENTATIONS

Invited Talks (8)

1. “Who Wants To Live Forever?”, Lehigh University, August 2013, 2014, 2015, 2016.
2. “What Happens Online, Stays Online... Forever”, Lehigh University, August 2012.
3. “What is Wasted Work in Transactional Memory?”, Schloss Dagstuhl, April 2012.
4. “Adaptivity in Software Transactional Memory”, University of Delaware, May 2010.
5. “Job Hunting in a Tight Market”, 2009 SOSP Diversity Workshop, Big Sky, MT, October 2009.

Refereed Presentations (20)

1. “Hand-Over-Hand Transactions with Precise Memory Reclamation”, 29th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Washington, DC, July 2017.
2. “Extending Transactional Memory with Atomic Deferral”, 29th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Washington, DC, July 2017.
3. “Towards Migrating Computation to Distributed Memory Caches”, Workshop on Distributed Cloud Computing (DCC), Chicago, IL, July 2016.
4. “Practical Condition Synchronization for Transactional Memory” 11th European Conference on Computer Systems (EuroSys 2016), London, UK, April 2016.
5. “Transactional Tools for the Third Decade”, ACM SIGPLAN Workshop on Transactional Computing, Portland, OR, June 2015.
6. “Transactionalizing Legacy Code: An Experience Report Using GCC and Memcached”, International Conference on Architectural Support for Programming lan-

- guages and Operating Systems (ASPLOS), Salt Lake City, UT, March 2014.
7. "STAMP Need Not Be Considered Harmful", ACM SIGPLAN Workshop on Transactional Computing (TRANSACT), Salt Lake City, UT, March 2014.
 8. "Boosting Timestamp-based Transactional Memory by Exploiting Hardware Cycle Counters", ACM SIGPLAN Workshop on Transactional Computing (TRANSACT), Houston, TX, March 2013.
 9. "Transactionalizing Legacy Code: An Experience Report Using GCC and Memcached", ACM SIGPLAN Workshop on Transactional Computing, Houston, TX, March 2013.
 10. "Read, Write, Play: An Educational Mobile Gaming Platform", ACM Technical Symposium on Computer Science Education, Denver, CO, March 2013.
 11. "Delegation and Nesting in Best Effort Hardware Transactional Memory", ACM Symposium on Parallelism in Algorithms and Architectures, Pittsburgh, PA, June 2012.
 12. "Towards Applying Machine Learning to Adaptive Transactional Memory", ACM SIGPLAN Workshop on Transactional Computing, San Jose, CA, June 2011.
 13. "Robust, Lightweight Adaptivity for Software Transactional Memory", ACM Symposium on Parallelism in Algorithms and Architectures, Santorini, Greece, June 2010.
 14. "Reducing Memory Ordering Overheads in Software Transactional Memory", International Symposium on Code Generation and Optimization, Seattle, Washington, March 2009.
 15. "A Comprehensive Strategy for Contention Management in Software Transactional Memory", ACM Symposium on Principles and Practice of Parallel Programming, Raleigh, North Carolina, February 2009.
 16. "Transactional Mutex Locks", ACM SIGPLAN Workshop on Transactional Computing, Raleigh, North Carolina, February 2009.
 17. "Inevitability Mechanisms for Software Transactional Memory", ACM SIGPLAN Workshop on Transactional Computing, Salt Lake City, Utah, February 2008.
 18. "Nonblocking Transactions Without Indirection Using Alert-on-Update", ACM Symposium on Parallelism in Algorithms and Architectures, San Diego, California, June 2007.
 19. "Lowering the Overhead of Software Transactional Memory", 1st ACM SIGPLAN Workshop on Transactional Computing (TRANSACT), Ottawa, Ontario, Canada, June 2006.
 20. "Solving the Starting Problem: Device Drivers as Self-Describing Artifacts", EuroSys 2006 Conference, Leuven, Belgium, April 2006.

TEACHING &
ADVISING

Courses Taught (27)

1. Spring 2017: CSE 216 Software Engineering (40 Undergraduate)
2. Fall 2017: CSE 216 Software Engineering (48 Undergraduate)
3. Fall 2017: Engr 5 Introduction to Engineering Practice: Computer Science Project (120 Undergraduate)
4. Spring 2017: CSE 216 Software Engineering (65 Undergraduate)
5. Fall 2016: CSE 303 Operating Systems (70 Undergraduate)
6. Fall 2016: Engr 5 Introduction to Engineering Practice: Computer Science Project (128 Undergraduate)
7. Spring 2016: CSE 375/475 Principles and Practice of Parallel Computing (16 Undergraduate / 9 Graduate)
8. Fall 2015: CSE 303 Operating Systems (65 Undergraduate)
9. Fall 2015: Engr 5 Introduction to Engineering Practice: Computer Science Project (128 Undergraduate)
10. Spring 2015: CSE 398 Large Scale Software Development (20 Undergraduate / 5 Graduate)

11. Spring 2015: CSE 202 Computer Organization and Architecture (102 Undergraduate)
12. Fall 2014: Engr 5 Introduction to Engineering Practice: Computer Science Project (128 Undergraduate)
13. Spring 2014: CSE 202 Computer Organization and Architecture (87 Undergraduate)
14. Spring 2014: CSE 350 Special Topics in Computer Systems (3 Undergraduate / 1 Graduate)
15. Fall 2013: CSE 375/475 Principles and Practice of Parallel Computing (17 Undergraduate / 15 Graduate)
16. Fall 2013: Engr 5 Introduction to Engineering Practice: Computer Science Project (128 Undergraduate)
17. Spring 2013: CSE 202 Computer Organization and Architecture (79 Undergraduate)
18. Fall 2012: CSE 303 Operating Systems Design (46 Undergraduate, 5 Graduate)
19. Fall 2012: Engr 98 Introduction to Engineering Practice: Computer Science Project (95 Undergraduate)
20. Spring 2012: CSE 398 Xtreme Projects: Mobile Programming (20 Undergraduate, 3 Graduate)
21. Spring 2012: CSE 403 Theory of Operating Systems (9 Graduate)
22. Fall 2011: CSE 375 Hardware and Software Topics in Parallel Computing (9 Undergraduate, 12 Graduate)
23. Fall 2011: Engr 98 Introduction to Engineering Practice: Computer Engineering Project (48 Undergraduate)
24. Spring 2011: CSE 403 Theory of Operating Systems (2 Undergraduate, 15 Graduate)
25. Fall 2010: CSE 201/ECE 201 Computer Architecture (22 Undergraduate)
26. Spring 2010: CSE 375/CSE 498 Hardware and Software Topics in Parallel Computing (6 Undergraduate, 17 Graduate)
27. Fall 2009: CSE 201/ECE 201 Computer Architecture (18 Undergraduate)

Doctoral Students Supervised (5)

1. Yujie Liu, "Crafting Concurrent Data Structures" (2010-2015). Initial employment: Google
2. Wenjia Ruan, "Accelerating Transactional Memory by Exploiting Platform Specificity" (2011-2015). Initial employment: Qualcomm Research
3. Tingzhe Zhou (2014-present, degree expected 2019)
4. PanteA Zardoshti (2016-present, degree expected 2021)
5. Matthew Rodriguez (2016-present, degree expected 2021)

Master's Degree Students Supervised (7)

1. Pavithra Balaji, "Supporting Instrumented Memory in LLVM" (2017). Initial Employment: Verizon.
2. Chao Wang, "Practical Condition Synchronization for Transactional Memory" (2016). Initial Employment: USC.
3. Stephen Louie, "A Framework For Transactional Speculative Parallelization" (2015). Initial employment: Cisco
4. Adam Schaub, "Migrating Computation in a Distributed Cache" (2015). Initial employment: Cisco
5. Trilok Vyas, "A Study of Synchronization Mechanisms in a Distributed Memory Caching System" (2012). Initial employment: Fidelity National Information Systems
6. Qingping Wang, "A Machine-Learning Approach to Transactional Memory" (2011). Initial employment: Jobvite.com

7. Francois Carouge (2010). Initial Employment: Lutron.

Undergraduate Students Supervised (49)

1. Joseph Boderck, Kaitlyn Hennessy, and Lizzie Shaffran, "CSETools" (CS Senior Design Project, 2018).
2. Hayley Poll and Ross Zimmerman, "Alexa Everywhere" (CompE Senior Design Project, 2017-2018).
3. Micah Carlisle and Max Hasselbusch, "Typescript Game Studio" (CS Senior Design Project, 2017); Winner of Judges Choice Award.
4. Ryan Cole, Miles Necker, and Amber Wallace, "Optimizing Run-Time Systems for Containerized Applications, 2017).
5. Luke Zhang, Christopher Szafranski, Michael Green, Lucy Swett, Basilio Garcia, Timothy Chartier, "Building Technology to Understand and Support STEM Skills in Young Children" (Lehigh Mountaintop Project, 2015-2017).
6. Louis Jenkins, "A Concurrent Map for Go" (2016 NSF REU Project). Honorable Mention, 2017 CRA Outstanding Undergraduate Researcher Awards.
7. Jennifer Brown and Casey Carouso, "Improving the Lehigh Transportation System" (Interdisciplinary Project, 2016).
8. Charlie Drazba and Nicholas Trivelis, "Magnetic Monkey" (CompE Senior Design Project, 2015-2016)
9. Tamara Hass and Adam Kafka, "App Factory" (CS Senior Design Project, 2016)
10. Benjamin Beauchamp and Paul Vasko, "Low Cost Home Energy Monitoring" (CompE Senior Design Project, 2014-2015)
11. Richard McKinley and Damiano DiFlorio, "Twitter-Based IoT Network Protocol" (CompE Senior Design Project, 2014-2015)
12. Sean Lawrence and Ryan Ricciardelli, "HotLava: A Safety-Aware Interactive Route Planner" (CS Senior Design Project, 2014)
13. Mitchell Goldstein and Connor Tench, "An Interactive Digital Whiteboard" (CS Senior Design Project, 2014)
14. Matthew Kilgore, "Transactionalizing the C++ Standard Template Library". Honorable Mention, 2015 CRA Outstanding Undergraduate Researcher Awards.
15. Ashley Quigley and Matthew Ross, "Expanding the CS Pipeline with Mobile Games" (CS Senior Design Project, 2013)
16. Nicholas Roessler and William Marshall, "A Machine Learning Approach to Garbage Collection" (CS Senior Design Project, 2013)
17. Steve Leonhardt and Konrad Nied, "Low-Cost Unidirectional Android/Arduino Communication and Applications" (CompE Senior Design Project, 2013-2014).
18. Logan McNamara, "Advanced Synchronization with Mindicators", Eckhard Thesis 2013. Finalist, 2013 CRA Outstanding Undergraduate Researcher Awards.
19. Ross Kaplan and Michael Berger, "Wireless Electronic Dog Leash" (CompE Senior Design Project, 2012-2013)
20. Ben Chen and Aman Ali, "LUMI: A Connected Notification System" (CompE Senior Design Project, 2012-2013)
21. Kavita Chaudhry and Tenzin Topchen, "Parked Automobile Hit-and-Run Detector" (CompE Senior Design Project, 2011-2012)
22. Michael Caffrey and Jonathan Hardy, "Microfinance: The Game" (CS Senior Design Project, 2011); Winner of Peers' Choice Award
23. Zachary Montgomery-Wicks and Evan Williams, "Function Pipelining" (CS Senior Design Project, 2010)

Undergraduate Academic Advising

1. First Year Engineering Advisees: 13 per year, 2011-2017
2. CSE and CompE Majors: 8 in AY2011, 16 in AY2012, 24 in AY2014, 24 in AY2015, 23 in AY2016, 20 in AY2017

Dissertation Committee Memberships

1. Nathen Wagenhoffer, doctoral candidate (MechE), under the direction of Prof. Justin Jaworski.
2. Ovidiu Dan, doctoral candidate (CS), under the direction of Prof. Brian Davison.
3. Dawei Li, doctoral candidate (CS), under the direction of Prof. Mooi Choo Chuah.
4. Sambhawa Priya, doctoral candidate (CS), under the direction of Prof. Jeff Heflin.
5. Ben Niu, PhD 2015 (CS), under the direction of Prof. Gang Tan.
6. Ulit Jaidee, PhD 2013 (CompE), under the direction of Prof. Hector Munoz-Avila.
7. Nahn Nguyen, PhD 2014 (CS, Chalmers University), under the direction of Prof. Philippas Tsigas.

SERVICE

University Service

Computer Science and Engineering Department, Lehigh University

- CS New Curriculum Committee, 2016-2017
- CS Curriculum Revision Committee, 2014-present (chair)
- Admissions Activity Chair, 2014-2015
- Professor of Practice Search Committee, 2014-2015 (co-chair)
- ACM Student Chapter Advisor, 2014-present
- ACM Student Chapter co-Advisor, 2012-2014
- Computer Facilities, 2011-present (chair 2012-2014)
- Publicity and Web, 2011-2014
- Computer Engineering Curriculum Committee, 2009-present
- Admissions Committee, 2009-2011
- PhD Qualifier Committee (Computer Architecture), 2009-2011
- PhD Program Review Committee, 2010-2011

P.C. Rossin College of Engineering and Applied Sciences, Lehigh University

- First Year Engineering Curriculum Task Force, 2017-present (co-chair)
- Undergraduate Curriculum Envisioning Team, 2016-2017 (co-chair)
- KEEN Entrepreneurial Engineering Education Team 2016-present (lead for CSE department).
- Dean of Engineering Search Committee, 2015-2016
- Computer Engineering Faculty Search Committee, 2014-2015

Lehigh University

- Faculty Committee on Student Life, 2013-2017 (chair 2015-2016)
- Faculty Steering Committee, 2015-2016
- Faculty Athletics Committee, 2011-present
- High Performance Computing Steering Committee, 2010-2014
- Research Computing Steering Committee, 2014-2016
- Veterans Day Celebration Planning Committee, 2012-present
- Data X Faculty Search Committee (Journalism and Computer Science Positions), 2015-2016 (co-chair)
- Vice Provost for Creative Inquiry Search Committee, 2015-2016.
- Vice Provost for Creative Inquiry Advisory Board, 2016-present.

Outreach Activities

- Spring Garden Elementary School Robot Day, 2012 (24 kindergarten students)
- Spring Garden Elementary School Robot Day, 2013 (24 kindergarten students, 25 first-grade students)
- Spring Garden Elementary School Computer Science Enrichment, 2013 (20 students in a 6-week program)

- Spring Garden Elementary School Computer Science Enrichment, 2014 (10 students in a 6-week program)
- Bethlehem Area School District Project Lead The Way mobiLEHIGH Event, 2014 (60 8th-grade students)
- Lehigh University S.T.A.R. Academy, 2014 (3 groups of 20 high school students)
- Bethlehem Area School District Project Lead The Way mobiLEHIGH Event, 2015 (70 8th-grade students)
- Bethlehem Area School District Project Lead The Way mobiLEHIGH Event, Spring 2016 (30 8th-grade students)
- Bethlehem Area School District Project Lead The Way mobiLEHIGH Event, Fall 2016 (60 8th-grade students)

Professional Activities

Organizing Committee Memberships

- Registration Chair, 16th ACM Symposium on Principles and Practice of Parallel Programming (2011)
- Co-chair, 2011 Workshop on Wild and Sane Ideas in Speculation and Transactions (2011)
- Program Chair, 7th ACM SIGPLAN Workshop on Transactional Computing (2012)
- General Chair, 8th ACM SIGPLAN Workshop on Transactional Computing (2013)
- Member, Study Group 5: Transactional Memory, ISO C++ Standardization Committee (2012-present)
- Steering Committee, ACM SIGPLAN Workshop on Transactional Computing (2012-2017)
- ACM Student Research Competition Chair, 2017 Richard Tapia Celebration of Diversity in Computing.
- Poster Chair, 2018 Richard Tapia Celebration of Diversity in Computing.

Program Committee Memberships

- Program Committee, 5th ACM Workshop on Transactional Computing (2010)
- Program Committee, 22nd ACM Symposium on Parallelism in Algorithms and Architectures (2010, 2018)
- External Review Committee, 16th ACM Symposium on Principles and Practice of Parallel Programming (2011)
- Program Committee, Algorithms Track, 2011 International Conference on Distributed Computing Systems (2011)
- Program Committee, 6th ACM Workshop on Transactional Computing (2011)
- Program Committee, 25th International Symposium on Distributed Computing (2011)
- External Review Committee, ACM SIGPLAN International Symposium on Memory Management (2012)
- Program Committee, 4th Workshop on the Theory of Transactional Memory (2012)
- Program Committee, 16th International Conference On Principles of Distributed Systems
- Program Committee, 2012 International Symposium on Computer Architecture and High Performance Computing
- Program Committee, 27th International Symposium on Distributed Computing (2013)
- Program Committee, 2013 International Conference on Distributed Computing Systems
- External Review Committee, 18th ACM Symposium on Principles and Practice of Parallel Programming (2013)

- Program Committee, 19th ACM Symposium on Principles and Practice of Parallel Programming (2014)
- Program Committee, 9th ACM Workshop on Transactional Computing (2014)
- Program Committee, 19th International Workshop on High-Level Parallel Programming Models and Supportive Environments (2014)
- External Review Committee, 20th ACM Symposium on Principles and Practice of Parallel Programming (2015)
- External Review Committee, 36th ACM Symposium on Programming Language Design and Implementation (2015)
- External Review Committee, 20th International Conference on Architectural Support for Programming Languages and Operating Systems (2015)
- Program Committee, 2015 ACM SIGMOD/PODS Conference
- Program Committee, 27th ACM Symposium on Parallelism in Algorithms and Architectures (2015)
- Program Committee, 10th ACM Workshop on Transactional Computing (2015)
- Program Committee, 2015 International Conference for High Performance Computing, Networking, Storage, and Analysis
- Program Committee, 24th International Conference on Parallel Architectures and Compilation Techniques (2015).
- External Review Committee, 21st International Conference on Architectural Support for Programming Languages and Operating Systems (2016)
- Program Committee, 22nd IEEE International Conference on Parallel and Distributed Systems (2016)
- Program Committee, International Conference on Parallel Programming (2016)
- Program Committee, ACM SIGPLAN International Symposium on Memory Management (2016)
- Program Committee, 8th Workshop on the Theory of Transactional Memory (2016)
- Program Committee, 2017 ACM SIGMOD/PODS Conference
- Program Committee, 10th ACM Workshop on Transactional Computing (2016)
- Program Committee, 11th ACM Workshop on Transactional Computing (2017)
- Program Committee, 31st International Symposium on Distributed Computing (2017)
- Program Committee, 30th ACM Symposium on Parallelism in Algorithms and Architectures (2018)
- Program Committee, ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (2018)
- Program Committee, 24th ACM Symposium on Principles and Practice of Parallel Programming (2019)

Outside Reviewer

- IEEE International Parallel & Distributed Processing Symposium (2010)
- International Symposium on High-Performance Computer Architecture (2010)
- Journal of Parallel and Distributed Computing (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017)
- ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (2010)
- IEEE Computer Architecture Letters (2010, 2011)
- International Conference on Parallel Architectures and Compilation Techniques (2010, 2013)
- Concurrency and Computation: Practice and Experience (2011, 2012)
- Distributed Computing (2011, 2016, 2017)
- IEEE Transactions on Parallel and Distributed Systems (2011, 2014, 2016, 2017)
- ACM Transactions on Architecture and Code Optimization (2013, 2014, 2016, 2017)

- International Workshop on Languages and Compilers for Parallel Computing (2011)
- ACM Transactions on Programming Languages and Systems (2011)
- ACM Transactions on Computer Systems (2012, 2013, 2016)
- Transactions on Computing (2012)
- EuroPar Conference (2012)
- International Conference on Parallel Processing (2012)
- IEEE MICRO Conference (2012)
- ACM Symposium on Parallelism in Algorithms and Architectures (2012, 2013, 2017)
- ACM Transactions in Embedded Computing Systems (2012, 2014)
- ACM Transactions on Parallel Computing (2013, 2014, 2016, 2017)
- Nineteenth International Conference on Architectural Support for Programming Languages and Operating Systems (2014)
- Information Sciences (2014)
- ACM Principles of Programming Languages (2015)
- IEEE Transactions on Computers (2014, 2016)
- The Computer Journal (2016)

Professional Society Membership

- ACM: Association for Computing Machinery (member since 2006)
- IEEE: Institute of Electrical and Electronics Engineers (member since 2010)