

Youtao Zhang

Associate Professor
Computer Science Department
University of Pittsburgh
Pittsburgh, PA 15260

Phone(Office): (412)624-8837
Email: zhangyt@cs.pitt.edu
Web: <http://people.cs.pitt.edu/~zhangyt>

RESEARCH INTERESTS

- Computer architecture: novel memory technologies; architectural support for security; chip multiprocessors; cache management; onchip interconnection.
- Compilers and program analysis: update-conscious compilation; program slicing; program profiling; code optimization.

EDUCATION

- Ph.D., Department of Computer Science, University of Arizona, Tucson, AZ, August 2002, Thesis: “The Design and Implementation of Compression Techniques for Profile Guided Compilation”, Advisor: Professor Rajiv Gupta.
- M.Eng., Department of Computer Science and Technology, Nanjing University, China, June 1996.
- B.S., Department of Computer Science and Technology, Nanjing University, China, June 1993.

EMPLOYMENT

- Associate Professor, University of Pittsburgh, Pittsburgh, PA, September 2011 – present.
- Assistant Professor, University of Pittsburgh, Pittsburgh, PA, January 2006 – August 2011.
- Assistant Professor, University of Texas at Dallas, Richardson, TX, November 2002 – December 2005.

AWARDS

- Best Paper Award, The International Symposium on Low Power Electronics and Design, September 2013.
- NSF CAREER Award, January 2005.
- Distinguished Paper Award, IEEE/ACM International Conference on Software Engineering, May 2003.
- Most Original Paper Award, International Conference on Parallel Processing, October 2003.

I. RESEARCH

PUBLICATIONS

JOURNAL PUBLICATIONS

- [J-1] CAL Rujia Wang, Sparsh Mittal, Youtao Zhang, and Jun Yang, “Decongest: Accelerating Super-Dense PCM under Write Disturbance by Hot Page Remapping,” *IEEE Computer Architecture Letters*, accepted.
- [J-2] DSS Shuai Ding, Chengyi Xia, Chengjiang Wang, Desheng Wu, and Youtao Zhang, “Multi-objective Optimization based Ranking Prediction for Cloud Service Recommendation,” *Elsevier, Decision Support Systems*, pages 106–114, Vol. 101, September 2017.
- [J-3] MICPRO Wen Wen, Jun Yang, and Youtao Zhang, “Optimizing Power Efficiency for 3D Stacked GPU-In-Memory Architecture,” *Elsevier Microprocessors and Microsystems: Embedded Hardware Design*, Vol. 49: 44-53, 2017.

- [J-4] TODAES Xianwei Zhang, Youtao Zhang, Bruce R. Childers, and Jun Yang, "On the Restore Time Variations of Future DRAM Memory," *IEEE Transactions on Design Automation of Electronic Systems*, Vol. 22(2), 26:1-26:24, 2017.
- [J-5] CAL Zhenning Wang, Jun Yang, Rami Melhem, Bruce R. Childers, Youtao Zhang, and Minyi Guo, "Simultaneous Multikernel: Fine-grained Sharing of GPUs," *IEEE Computer Architecture Letters*, pages 113-116, Vol. 15(2), 2016.
- [J-6] TODAES Lei Jiang, Bo Zhao, Jun Yang, and Youtao Zhang, "Constructing Large and Fast On-chip Cache for Mobile Processors with Multi-Level Cell STT-MRAM Technology," *IEEE Transactions on Design Automation of Electronic Systems*, Vol. 20(4), 54:1-54:24, 2015.
- [J-7] TOPC Yi Xu, Bo Zhao, Jun Yang, and Youtao Zhang, "Simple Virtual Channel Allocation for High Throughput and High Frequency On-Chip Routers," *ACM Transactions on Parallel Computing*, pages 6:1-6:23, Vol. 2(1), 2015.
- [J-8] TCAD Mengying Zhao, Lei Jiang, Liang Shi, Youtao Zhang and Chun Jason Xue, "Wear Relief for High-density Phase Change Memory through Cell Morphing Considering Process Variation," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, pages 227-237, Vol. 34(2), 2015.
- [J-9] TC Ping Zhou, Bo Zhao, Youtao Zhang, and Jun Yang, "Throughput Enhancement for Phase Change Memories," *IEEE Transactions on Computers*, Vol. 63(8), 2080-2093, 2014.
- [J-10] KBS Shuai Ding, Shanlin Yang, Youtao Zhang, Chang-yong Liang, Chenyi Xia, "Combining QoS Prediction and Customer Satisfaction Estimation to Solve Cloud Service Trustworthiness Evaluation Problems," *Elsevier Journal, Knowledge Based Systems*, Vol. 56, 216-225, 2014.
- [J-11] TODAES Bo Zhao, Jun Yang, Youtao Zhang, Yiran Chen, and Hai Li, "Architecting a Common-Source-Line Array for Bipolar Non-Volatile Memory Devices," *IEEE Transactions on Design Automation of Electronic Systems*, Vol. 18(4), 2013.
- [J-12] TC Bo Zhao, Yu Du, Jun Yang, and Youtao Zhang, "Process Variation Aware Non-Uniform Cache Management in 3D Die Stacked Multicore Processor," *IEEE Transactions on Computers*, Vol. 62(11), 2252-2265, 2013.
- [J-13] TACO Lei Jiang, Yu Du, Bo Zhao, Youtao Zhang, Bruce R. Childers, and Jun Yang, "Hardware Assisted Cooperative Integration of Wear-Leveling and Salvaging for Phase Change Memory, " *ACM Transactions on Architecture and Code Optimization*, Vol. 10(2), May 2013.
- [J-14] JSA Yang Zhao, Youtao Zhang, Zhiguang Qin, Taieb Znati, "A Co-commitment based Secure Data Collection Scheme for Tiered Wireless Sensor Networks," *Journal of System Architecture*, Vol. 57(6), pages 655-662, 2011.
- [J-15] JPDC Jun Yang, Lan Gao, Youtao Zhang, Marek Chrobak, and Hsien-Hsin S Lee, "A Low-cost Memory Remapping Scheme for Address Bus Protection," *Journal of Parallel and Distributed Computing*, Vol. 70(5), pages 443-457, 2010.
- [J-16] TACO Xiuyi Zhou, Jun Yang, Marek Chrobak, and Youtao Zhang, "Performance-aware thermal management via task scheduling," *ACM Transactions on Architecture and Code Optimization*, Vol. 7(1), pages 5:1-5:31, 2010.
- [J-17] WINET Youtao Zhang, Jun Yang, Hai T. Vu, and Yizhi Wu, "The Design and Evaluation of Interleaved Authentication for Filtering False Reports in Multipath Routing WSNs," *Wireless Networks*, Springer, Vol. 16(1), pages 125-140, 2010.
- [J-18] TPDS Xiuyi Zhou, Jun Yang, Yi Xu, Youtao Zhang, Jianhua Zhao, "Thermal-Aware Task Scheduling for 3D Multicore Processors," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 21(1), pages 60-71, 2010.
- [J-19] IEEE Micro Benjamin C. Lee, Ping Zhou, Doug Burger, Engin Ipek, Onur Mutlu, Jun Yang, Youtao Zhang, and Bo Zhao, "Phase Change Technology and the Future of Main Memory (tentative title)," *IEEE Micro, Special Issue: Micro's Top Picks from 2009 Computer Architecture Conferences (MICRO TOP PICKS)*, Vol. 30(1), January/February 2010.
- [J-20] JNCA Youtao Zhang, Jun Yang, Weijia Li, Linzhang Wang, and Lingling Jin, "An Authentication Scheme for Locating Compromised Sensor Nodes in WSNs," *Journal of Network and Computer Applications*, Elsevier, Vol 33(1), pages 50-62, 2010.

- [J-21] TACO Weijia Li, Youtao Zhang, Jun Yang, and Jiang Zheng, “Towards Update-Conscious Compilation for Energy-Efficient Code Dissemination in WSNs,” *ACM Transactions on Architecture and Code Optimization*, Vol. 6(4), 2009.
- [J-22] JCEE Youtao Zhang, Jun Yang, and Lan Gao, “Supporting Flexible Streaming Media Protection through Privacy-aware Secure Processors,” a special issue on Circuits and Systems for Real-Time Security and Copyright Protection of Multimedia, *Journal of Computers and Electrical Engineering*, Elsevier, Vol. 35(2), pages 286–299, 2009.
- [J-23] JSS Yongjing Lin, Youtao Zhang, and Rajiv Gupta, “The Design and Evaluation of Path Matching Schemes on Compressed Control Flow Traces”, *Journal of Systems and Software*, Elsevier, Vol. 80(3), pages 396–409, 2007.
- [J-24] SP&E Youtao Zhang and Rajiv Gupta, “Compressing Heap Data for Improved Memory Performance,” *Software Practice & Experience*, Vol. 36(10), pages 1081–1111, 2006.
- [J-25] TC Jun Yang, Lan Gao, and Youtao Zhang, “Improving Memory Encryption Performance in Secure Processors,” *IEEE Transactions on Computers*, Vol. 54(5), pages 630–640, 2005. **Featured in MIT Technology Review, July 2005.**
- [J-26] JSA Jun Yang, Jia Yu, and Youtao Zhang, “A Low Energy Cache Design for Multimedia Applications Exploiting Set Access Locality,” *Journal of Systems Architecture*, Elsevier, Vol. 51(10–11), pages 653–664, 2005.
- [J-27] TOPLAS Xiangyu Zhang, Rajiv Gupta, and Youtao Zhang, “Cost and Precision Tradeoffs of Dynamic Slicing Algorithms,” *ACM Transactions on Programming Languages and Systems*, Vol. 27(4), pages 631–661, 2005.
- [J-28] JEC Youtao Zhang and Jun Yang, “Reducing I-cache Energy of Multimedia Applications through LowCost Tag Comparison Elimination,” *Journal of Embedded Computing*, IOS Press, Vol. 1(4), pages 461–470, 2005.
- [J-29] IJHPCN Zili Shao, Qingfeng Zhuge, Youtao Zhang, Edwin H.-M. Sha, “Algorithms and Analysis of Scheduling for Low-Power High-Performance DSP on VLIW Processors,” *International Journal of High Performance Computing and Networking*, Vol. 1, pages 3–16, 2004.

CONFERENCE PUBLICATIONS

- [C-1] ISCA Zhenning Wang, Jun Yang, Rami Melhem, Bruce R. Childers, Youtao Zhang, and Minyi Guo, “Quality of Service Support for Fine-Grained Sharing on GPUs,” *The 44th International Symposium on Computer Architecture*, Toronto, ON, Canada, 2017.
- [C-2] HPCA Rujia Wang, Youtao Zhang, and Jun Yang, “Cooperative Path-ORAM for Effective Memory Bandwidth Sharing in Server Settings,” *IEEE the 23rd International Symposium on High-Performance Computer Architecture*, Austin, TX, February 2017.
- [C-3] PACT Xianwei Zhang, Youtao Zhang, Bruce R. Childers, and Jun Yang, “DrMP: Mixed Precision-aware DRAM for High Performance Approximate and Precise Computing,” *IEEE the 26th International Symposium on High-Performance Computer Architecture*, Portland, Oregon, September 2017.
- [C-4] ICCAD Lei Zhao, Youtao Zhang and Jun Yang, “AEP: An Error-bearing Neural Network Accelerator for Energy Efficiency and Model Protection,” *IEEE/ACM International Conference on Computer-Aided Design*, Irvine, CA, November 2017.
- [C-5] ICCAD Quan Deng, Youtao Zhang, Minxuan Zhang and Jun Yang, “Towards Warp-Scheduling Friendly STT-MRAM/SRAM Hybrid GPGPU Register File Design,” *IEEE/ACM International Conference on Computer-Aided Design*, Irvine, CA, November 2017.
- [C-6] ICCAD Wen Wen, Lei Zhao, Youtao Zhang and Jun Yang, “Speeding Up Crossbar Resistive Memory by Exploiting In-memory Data Patterns,” *IEEE/ACM International Conference on Computer-Aided Design*, Irvine, CA, November 2017.
- [C-7] ISQED Lei Zhao, Lei Jiang, Youtao Zhang, Nong Xiao, and Jun Yang, “Constructing Fast and Energy Efficient 1TnR based ReRAM Crossbar Memory,” *IEEE the 18th International Symposium on Quality Electronic Design*, Santa Clara, March 2017. **Nominated for best paper award.**

- [C-8] ICCD Wen Wen, Youtao Zhang, and Jun Yang, "Read Error Resilient MLC STT-MRAM based Last Level Cache," *The 35th IEEE International Conference on Computer Design*, Boston, Massachusetts, November 2017.
- [C-9] NVMSA Lei Zhao, Youtao Zhang, and Jun Yang, "Mitigating Shift-Based Covert-Channel Attacks in Racetrack Last Level Caches," *The 5th Non-Volatile Memory Systems and Applications Symposium*, Hsinchu, Taiwan, August 2017.
- [C-10] CODES + ISSS Mimi Xie, Mengying Zhao, Hehe Li, Chen Pan, Youtao Zhang, Yongpan Liu, Jason Xue, and Jingtong Hu, "Checkpoint Aware Hybrid Cache Architecture for NV Processor in Energy Harvesting Powered Systems," *The International Conference on Hardware/Software Codesign and System Synthesis*, Pittsburgh, October 2016.
- [C-11] NVMSA Chi Zhang, Wonsun Ahn, Youtao Zhang, and Bruce R. Childers, "Live Code Update for IoT Devices in Energy Harvesting Environments," *The 5th Non-Volatile Memory Systems and Applications Symposium*, Daegu, Korea, August 2016.
- [C-12] DSN Rujia Wang, Youtao Zhang, and Jun Yang, "ReadDuo: Constructing Reliable MLC Phase Change Memory through Fast and Robust Readout," *The 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks*, Toulouse, France, June 2016.
- [C-13] HPCA Xianwei Zhang, Youtao Zhang, Bruce R. Childers, and Jun Yang, "Restore Truncation for Performance Improvement in Future DRAM Systems," *IEEE the 22nd International Symposium on High-Performance Computer Architecture*, Barcelona, Spain, March 2016.
- [C-14] HPCA Zhenning Wang, Jun Yang, Rami Melhem, Bruce R. Childers, Youtao Zhang, and Minyi Guo, "Simultaneous Multikernel GPU: Multi-tasking Throughput Processors via Fine-Grained Sharing," *IEEE the 22nd International Symposium on High-Performance Computer Architecture*, Barcelona, Spain, March 2016.
- [C-15] ICCD Xianwei Zhang, Lei Zhao, Youtao Zhang, and Jun Yang, "Exploit Common Source-Line to Construct Energy Efficient Domain Wall Memory based Caches," *The 33rd IEEE International Conference on Computer Design*, New York City, October 2015.
- [C-16] ICCD Xianwei Zhang, Youtao Zhang, and Jun Yang, "DLB: Dynamic Lane Borrowing for Improving Bandwidth and Performance in Hybrid Memory Cube," *The 33rd IEEE International Conference on Computer Design*, New York City, October 2015.
- [C-17] ICCD Xianwei Zhang, Youtao Zhang, and Jun Yang, "TriState-SET: Proactive SET for Improved Performance of MLC Phase Change Memories," *The 33rd IEEE International Conference on Computer Design*, New York City, October 2015.
- [C-18] MEM-SYS Bruce R. Childers, Jun Yang, and Youtao Zhang, "Achieving Yield, Density and Performance Effective DRAM at Extreme Technology Sizes," *International Symposium on Memory Systems*, Washington, DC, October 2015.
- [C-19] DAC Rujia Wang, Lei Jiang, Youtao Zhang, Linzhang Wang, and Jun Yang, "Selective Restore: an Energy Efficient Read Disturbance Mitigation Scheme for Future STT-MRAM," *The 52nd ACM/IEEE Design Automation Conference*, San Francisco, CA, June 2015.
- [C-20] DAC Rujia Wang, Lei Jiang, Youtao Zhang, Linzhang Wang, and Jun Yang, "Exploit Imbalanced Cell Writes to Mitigate Write Disturbance in Dense Phase Change Memory," *The 52nd ACM/IEEE Design Automation Conference*, San Francisco, CA, June 2015.
- [C-21] ASPLOS Rujia Wang, Lei Jiang, Youtao Zhang, and Jun Yang, "SD-PCM: Constructing Reliable Super Dense Phase Change Memory under Write Disturbance," *The 20th International Conference on Architectural Support for Programming Languages and Operating Systems*, Istanbul, Turkey, March 2015.
- [C-22] DATE Xianwei Zhang, Youtao Zhang, Bruce Childers, and Jun Yang, "Exploiting DRAM Restore Time Variations in Deep Sub-micron Scaling," *The IEEE conference on Design, Automation and Test in Europe*, Grenoble, France, March 2015.
- [C-23] HPCC Yizhi Wu, and Youtao Zhang, "GA based Placement Optimization for Hybrid Distributed Storage," *The IEEE 17th International Conference on High Performance Computing and Communications*, New York, August 2015.

- [C-24] CLUSTER Yimo Du, Youtao Zhang, Nong Xiao, and Fang Liu, "CD-RAIS: Constrained dynamic striping in redundant array of independent SSDs," *The 2014 IEEE International Conference on Cluster Computing*, September 22-26, Madrid, Spain, 2014.
- [C-25] ICPP Yimo Du, Youtao Zhang, and Nong Xiao, "R-Dedup: Content Aware Redundancy Management for SSD-based RAID Systems," *The 43rd International Conference on Parallel Processing*, Minneapolis, MN, 2014.
- [C-26] ISCA Lei Jiang, Bo Zhao, Youtao Zhang, and Jun Yang, "A Low Power and Reliable Charge Pump Design for Phase Change Memories," *The 41st International Symposium on Computer Architecture*, Minneapolis, MN, 2014.
- [C-27] DSN Lei Jiang, Youtao Zhang, and Jun Yang, "Mitigating Write Disturbance in Super Dense Phase Change Memories," *The 44th Annual IEEE/IFIP International Conference on Dependable Systems and Networks*, San Atlanta, GA, 2014.
- [C-28] DAC Mengying Zhao, Lei Jiang, Youtao Zhang, Chun Jason Xue, "SLC-enabled Wear Leveling for MLC PCM Considering Process Variation," *The 51st ACM/IEEE Design Automation Conference*, San Francisco, CA, June 2014.
- [C-29] APCIIT Yizhi Wu, Guo Zhang, Youtao Zhang, "Evolution Algorithm Based PRAM/DRAM Hybrid Memory Allocation Optimization," *The 2013 Asia-Pacific Computational Intelligence and Information Technology Conference*, Shanghai, China, December 2013.
- [C-30] ISLPED Xianwei Zhang, Lei Jiang, Youtao Zhang, Chuanjun Zhang, and Jun Yang, "WoM-SET: Lowering Write Power of Proactive-SET based PCM Write Strategy using WoM Code," *The International Symposium on Low Power Electronics and Design*, Beijing, China, 2013. **Best paper award.**
- [C-31] LCTES Qingan Li, Lei Jiang, Youtao Zhang, Yanxiang He and Chun Xue, "Compiler Directed Write-Mode Selection for High Performance Low Power Volatile PCM," *ACM SIGPLAN/SIGBED Conference on Languages, Compilers and Tools for Embedded Systems*, Seattle, June 2013.
- [C-32] NOCS Bo Zhao, Youtao Zhang, and Jun Yang, "A Speculative Arbiter Design to Enable High-Frequency Many-VC Router in NoCs," *The 7th International Symposium on Networks-on-Chip*, Tempe, Arizona, April 2013.
- [C-33] DATE Jie Guo, Jun Yang, Youtao Zhang, and Yiran Chen, "Low Cost Power Failure Protection For MLC NAND Flash Storage Systems with PRAM/DRAM Hybrid Buffer," *The IEEE conference on Design, Automation and Test in Europe*, Grenoble, France, 2013.
- [C-34] MICRO Lei Jiang, Youtao Zhang, Bruce R. Childers, and Jun Yang, "FPB: Fine-grained Power Budgeting to Improve Write Throughput of Multi-level Cell Phase Change Memory," *The 45th Annual IEEE/ACM International Symposium on Microarchitecture*, Vancouver, BC, Canada, December 2012. (acceptance rate = 40/228 = 17.5%).
- [C-35] ISLPED Lei Jiang, Youtao Zhang, and Jun Yang, "ER: Elastic RESET for Low Power and Long Endurance MLC based Phase Change Memory," *The International Symposium on Low Power Electronics and Design*, Redondo Beach, CA, July 2012. **Nominated for best paper award.**
- [C-36] DAC Lei Jiang, Bo Zhao, Youtao Zhang, and Jun Yang, "Constructing Large and Fast Multi-level Cell STT-MRAM based Cache for Embedded Processors," *ACM/IEEE the 49th Design Automation Conference*, San Francisco, CA, June 2012. (acceptance rate = 168/741 = 23%).
- [C-37] HPCA Lei Jiang, Bo Zhao, Youtao Zhang, Jun Yang, and Bruce R. Childers, "Improving Write Operations in MLC Phase Change Memory," *IEEE the 18th International Symposium on High-Performance Computer Architecture*, pages 1-10, New Orleans, Louisiana, February 2012. (acceptance rate = 36/210 = 17%).
- [C-38] ISLPED Lei Jiang, Youtao Zhang, and Jun Yang, "Enhancing Phase Change Memory Lifetime through Fine-Grained Current Regulation and Voltage Upscaling," *The International Symposium on Low Power Electronics and Design*, pages 127-132, Fukuoka, Japan, August 2011. (acceptance rate = 66/201 = 22.4%).
- [C-39] ICS Yi Xu, Yu Du, Youtao Zhang, and Jun Yang, "A Composite and Scalable Cache Coherence Protocol for Large Scale CMPs," *The 25th International Conference on Supercomputing*, pages 285-294, Tucson, Arizona, June 2011. (acceptance rate = 35/161 = 21.7%).

- [C-40] DSN Lei Jiang, Yu Du, Youtao Zhang, Bruce R. Childers, and Jun Yang, "LLS: Cooperative Integration of Wear-Leveling and Salvaging for PCM Main Memory," *The 41st Annual IEEE/IFIP International Conference on Dependable Systems and Networks*, Hong Kong, China, June 2011. (DCCS track acceptance rate = 26/148=17.6%).
- [C-41] ISPASS Santiago Bock, Bruce R. Childers, Rami Melhem, Daniel Mosse, and Youtao Zhang, "Analyzing the Impact of Useless Write-backs on Endurance and Energy Consumption of PCM Main Memory," *IEEE International Symposium on Performance Analysis of Systems and Software*, pages 56–65, Austin, Texas, April 2011. (acceptance rate = 24/64 = 37.5%).
- [C-42] DATE Lin Li, Youtao Zhang, and Jun Yang, "Proactive Recovery for BTI in High-k SRAM Cells," *The IEEE conference on Design, Automation and Test in Europe*, pages 1–6, Grenoble, France, 2011. (acceptance rate = 211/781=27%).
- [C-43] IPDPS Ping Zhou, Yu Du, Youtao Zhang, and Jun Yang, "Fine-Grained QoS Scheduling for PCM-based Main Memory Systems," *IEEE the 24th International Parallel & Distributed Processing Symposium*, Atlanta, Georgia, April 2010. (acceptance rate = 127/527 = 24%).
- [C-44] LCTES Weijia Li, and Youtao Zhang, "An Efficient Code Update Scheme for DSP Applications in Mobile Embedded Systems," *ACM SIGPLAN/SIGBED Conference on Languages, Compilers and Tools for Embedded Systems*, Stockholm, Sweden, April 2010. (acceptance rate = 18/58 = 31%).
- [C-45] DATE Lin Li, Youtao Zhang, Jun Yang, and Jianhua Zhao, "Proactive NBTI Mitigation for Busy Functional Units in Out-of-Order Microprocessors," *The IEEE conference on Design, Automation and Test in Europe*, Dresden, Germany, March 8-12, 2010. (acceptance rate = 26%).
- [C-46] HPCA Yi Xu, Bo Zhao, Youtao Zhang, and Jun Yang, "Simple Virtual Channel Allocation for High Throughput and High Frequency On-Chip Routers," *IEEE the 16th International Symposium on High-Performance Computer Architecture*, Bangalore, India, January 2010. (acceptance rate = 32/175 = 18%).
- [C-47] MICRO Bo Zhao, Yu Du, Youtao Zhang, and Jun Yang, "Variation-Tolerant Non-Uniform 3D Cache Management in Die Stacked Multicore Processor," *The 42nd Annual IEEE/ACM International Symposium on Microarchitecture*, pages 222-231, New York, December 2009. (acceptance rate = 52/210 = 25%).
- [C-48] ICCAD Ping Zhou, Bo Zhao, Jun Yang, and Youtao Zhang, "Energy Reduction for STT-RAM Using Early Write Termination," *IEEE/ACM International Conference on Computer-Aided Design*, pages 264-268, San Jose, CA, November 2009. acceptance rate = 115/438 = 26%).
- [C-49] ISCA Ping Zhou, Bo Zhao, Jun Yang, and Youtao Zhang, "A Durable and Energy Efficient Main Memory Using Phase Change Memory Technology," *The 36th International Symposium on Computer Architecture*, pages 14-23, Austin, Texas, June 2009. (acceptance rate = 43/210 = 20%).
- [C-50] RTCSA Yang Zhao, Youtao Zhang, Zhiguang Qin, and Taieb Znati, "SDC: Secure Data Collection for Time Based Queries in Tiered Wireless Sensor Networks," *The 15th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications*, pages 255-262, Beijing, China, August 2009. (acceptance rate: 39/124=31%).
- [C-51] DCOSS Weijia Li, Youtao Zhang, and Bruce Childers, "MCP: an Energy-Efficient Code Distribution Protocol for Multi-Application WSNs," *The 5th IEEE International Conference on Distributed Computing in Sensor Systems*, LNCS 5516, Springer-Verlag, pages 259-272, Marina Del Rey, California, June 2009. (acceptance rate = 26/116 = 22%).
- [C-52] HPCA Yi Xu, Yu Du, Bo Zhao, Xiuyi Zhou, Youtao Zhang, and Jun Yang, "A Low-Radix and Low-Diameter 3D Interconnection Network Design," *IEEE the 15th International Symposium on High-Performance Computer Architecture*, pages 30–41, Raleigh, North Carolina, 2009. **Nominated for best paper award.** (acceptance rate = 35/184 = 19%).
- [C-53] ASPDACC Ping Zhou, Bo Zhao, Yi Xu, Yu Du, Youtao Zhang, Jun Yang, Li Zhao, "Frequent Value Compression in Packet-based NoC Architecture," *The 14th Asia and South Pacific Design Automation Conference*, Yokohama, Japan, January 2009. (acceptance rate = 116/355 = 33%).

- [C-54] EUC Weijia Li, Yu Du, Youtao Zhang, Bruce Childers, Ping Zhou, Jun Yang, "Adaptive Buffer Management for Efficient Code Dissemination in Multi-Application Wireless Sensor Networks," *International Conference on Embedded and Ubiquitous Computing*, Shanghai, China, 2008. (acceptance rate = $70/233 = 30\%$).
- [C-55] ICPP Xiuyi Zhou, Yi Xu, Yu Du, Youtao Zhang and Jun Yang, "Thermal Management for 3D Processors via Task Scheduling," *International Conference on Parallel Processing*, Portland, Oregon, September 2008. (acceptance rate = $81/263 = 30\%$).
- [C-56] ISPASS Jun Yang, Xiuyi Zhou, Marek Chrobak, Youtao Zhang, Lingling Jin, "Dynamic Thermal Management through Task Scheduling," *International Symposium on Performance Analysis of Systems and Software*, April 2008. (acceptance rate = $22/63 = 35\%$).
- [C-57] PLDI Weijia Li, Youtao Zhang, Jun Yang, and Jiang Zheng, "UCC: Update-conscious Compilation for Energy Efficiency in Wireless Sensor Networks," *ACM SIGPLAN Conference on Programming Language Design and Implementation*, San Diego, California, 2007. (acceptance rate = $45/178 = 25\%$).
- [C-58] MASS Weijia Li, Youtao Zhang, and Jun Yang, "Dynamic Authentication-Key Re-assignment for Reliable Report Delivery," *The 3rd IEEE International Conference on Mobile Ad-hoc and Sensor Systems*, Vancouver, Canada, October 2006. (acceptance rate = $49/197 = 25\%$).
- [C-59] ICCD Lingling Jin, Wei Wu, Jun Yang, Chuanjun Zhang, and Youtao Zhang, "Reduce Register Files Leakage Through Discharging Cells," *International Conference on Computer Design*, California, October 2006. (acceptance rate = $45/178 = 25\%$).
- [C-60] PACT Lan Gao, Jun Yang, Marek Chrobak, Youtao Zhang, San Nguyen, Hsien-Hsin Lee, "A Low-cost Memory Remapping Scheme for Address Bus Protection," *The 15th International Conference on Parallel Architectures and Compilation Techniques*, Seattle, Washington, September 2006. (acceptance rate = $30/117 = 26\%$).
- [C-61] DCOSS Youtao Zhang, Jun Yang, Lingling Jin, and Weijia Li, "Locating Compromised Sensor Nodes through Incremental Hashing Authentication," *IEEE International Conference on Distributed Computing in Sensor Systems*, San Francisco, June 2006. (acceptance rate = $33/87 = 38\%$).
- [C-62] IPDPS Youtao Zhang, Jun Yang, and Hai T Vu, "The Interleaved Authentication for Filtering False Reports in Multipath Routing based Sensor Networks," *IEEE 20th International Parallel and Distributed Processing Symposium*, Rhodes Island, Greece, April 2006. (acceptance rate = $125/531 = 24\%$).
- [C-63] HPCA Weidong Shi, Joshua B. Fryman, Guofei Gu, Hsien-Hsin S. Lee, Youtao Zhang, and Jun Yang, "InfoShield: A Security Architecture for Protecting Information Usage in Memory," *IEEE 12th International Symposium on High-Performance Computer Architecture*, Austin, TX, February 2006. (acceptance rate = $26/172 = 15\%$).
- [C-64] HPCA Youtao Zhang, Lan Gao, Jun Yang, Xiangyu Zhang, and Rajiv Gupta, "SENS: Security Enhancement to Symmetric Shared Memory Multiprocessors," *IEEE 11th International Symposium on High Performance Computer Architecture*, San Francisco, California, February 2005. (acceptance rate = $28/181 = 15\%$).
- [C-65] SAC Yongjing Lin, Youtao Zhang, Quanzhong Li, and Jun Yang, "Supporting Efficient Query Processing on Compressed XML Files," *ACM The 20th Annual Symposium on Applied Computing*, Santa Fe, New Mexico, March, 2005. (acceptance rate = $278/764 = 36\%$).
- [C-66] DCC Yongjing Lin, and Youtao Zhang, "Performance Comparison of Path Matching Algorithms over Compressed Control Flow Traces," *IEEE Data Compression Conference*, Snowbird, Utah, March 2005. (acceptance rate = n/a).
- [C-67] ICSS Lingling Jin, Wei Wu, Jun Yang, Chuanjun Zhang, and Youtao Zhang, "Dynamic Co-allocation of Level One Caches," *The Second International Conference on Embedded Software and Systems*, pages 373-385, Xi'an, China 2005. (acceptance rate = $68/361 = 19\%$).
- [C-68] ICSE Xiangyu Zhang, Rajiv Gupta, and Youtao Zhang, "Efficient Forward Computation of Dynamic Slices Using Reduced Ordered Binary Decision Diagrams," *IEEE/ACM International Conference on Software Engineering*, Edinburgh, UK, May 2004. (acceptance rate = $58/436 = 13\%$).

- [C-69] ICPADS Guodong Li, Youtao Zhang, Yongjing Lin, Yaochun Huang, “Scalable Duplication Strategy with Bounded Availability of Processors,” *IEEE The Tenth International Conference on Parallel and Distributed Systems*, Newport Beach, California, July 2004. (acceptance rate = 65/292 = 22%).
- [C-70] MICRO Jun Yang, Youtao Zhang and Lan Gao, “Fast Secure Processor for Inhibiting Software Piracy and Tampering,” *IEEE/ACM 36th International Symposium on Microarchitecture*, pages 351-360, San Diego, December 2003. (acceptance rate = 35/134 = 26%).
- [C-71] ICPP Youtao Zhang and Rajiv Gupta, “Enabling Partial Cache Line Prefetching Through Data Compression,” *International Conference on Parallel Processing*, pages 277-285, Kaohsiung, Taiwan, October 2003. (acceptance rate = 69/192 = 36%). **ICPP 2003 Most Original Paper Award.**
- [C-72] ICPP Youtao Zhang and Jun Yang, “Procedural Level Address Offset Assignment of DSP Applications with Loops,” *International Conference on Parallel Processing*, pages 21-28, Kaohsiung, Taiwan, October 2003. (acceptance rate = 69/192 = 36%).
- [C-73] ICSE Xiangyu Zhang, Rajiv Gupta, and Youtao Zhang, “Precise Dynamic Slicing Algorithms,” *IEEE/ACM International Conference on Software Engineering*, pages 319-329, Portland, Oregon, May 2003. (acceptance rate = 42/324 = 13%). **ICSE 2003 Distinguished Paper Award.**
- [C-74] ISLPED Youtao Zhang and Jun Yang, “Low Cost Instruction Cache Designs for Tag Comparison Elimination,” *ACM/IEEE International Symposium on Low Power Electronics and Design*, pages 266-269, Seoul, Korea, August 2003. (acceptance rate = 90/221 = 41%).
- [C-75] ISLPED Jun Yang, Jia Yu, and Youtao Zhang, “Lightweight Set Buffer: Low Power Data Cache for Multimedia Applications,” *ACM/IEEE International Symposium on Low Power Electronics and Design*, pages 270-273, Seoul, Korea, August 2003. (acceptance rate = 90/221 = 41%).
- [C-76] CC Youtao Zhang and Rajiv Gupta, “Data Compression Transformations for Dynamically Allocated Data Structures,” *International Conference on Compiler Construction*, LNCS 2304, Springer Verlag, pages 14-28, Grenoble, France, April 2002. (acceptance rate = 18/44 = 41%).
- [C-77] CC Rajiv Gupta, Eduard Mehofer, and Youtao Zhang, “A Representation for Bit Section based Analysis and Optimization,” *International Conference on Compiler Construction*, LNCS 2304, Springer Verlag, pages 62-77, France, April 2002. (acceptance rate = 18/44 = 41%).
- [C-78] DCC Youtao Zhang and Rajiv Gupta, “Path Matching in Compressed Control Flow Traces,” *IEEE Data Compression Conference*, pages 132-141, Snowbird, Utah, April 2002. (acceptance rate = n/a).
- [C-79] PLDI Youtao Zhang and Rajiv Gupta, “Timestamped Whole Program Path Representation and its Applications,” *ACM SIGPLAN Conference on Programming Language Design and Implementation*, pages 180–190, Snowbird, Utah, June 2001. (acceptance rate = 30/144 = 21%).
- [C-80] MICRO Jun Yang, Youtao Zhang, and Rajiv Gupta, “Frequent Value Compression in Data Caches,” *IEEE/ACM 33rd International Symposium on Microarchitecture*, pages 258–265, Monterey, CA, December 2000. (acceptance rate = 31/110 = 28%).
- [C-81] ASPLOS Youtao Zhang, Jun Yang, and Rajiv Gupta, “Frequent Value Locality and Value-Centric Data Cache Design,” *ACM 9th International Conference on Architectural Support for Programming Languages and Operating Systems*, pages 150-159, Cambridge, MA, November 2000. (acceptance rate = 24/114 = 21%).

BOOK CHAPTERS

- [B-1] JW&S Youtao Zhang, Rajiv Gupta, “Enabling Partial Cache Line Prefetching Through Data Compression,” *High-Performance Computing: Paradigm and Infrastructure*, pages 183-200, John Wiley & Sons, Inc., October 2005.
- [B-2] CRC Rajiv Gupta, Eduard Mehofer and Youtao Zhang, “Profile Guided Code Optimizations,” *The Compiler Design Handbook: Optimizations and Machine Code Generation, Chapter 4*, CRC Press, September 2002.

WORKSHOP/POSTER PUBLICATIONS

- [EA-1] MEM-SYS Xianwei Zhang, Youtao Zhang, and Jun Yang, "AWARD: Approximation-aWare Restore in Further Scaling DRAM," (Extended Abstract), *The International Symposium on Memory Systems*, Washinton D.C., October 2016.
- [P-2] DAC Xianwei Zhang, Youtao Zhang, Bruce R. Childers, and Jun Yang, "Adaptive Lane Borrowing of Hybrid Memory Cube," (Poster), *The 52nd ACM/IEEE Design Automation Conference*, San Francisco, CA, June 2015.
- [IP-3] DATE Ping Zhou, Youtao Zhang, and Jun Yang, "The Design of Sustainable Wireless Sensor Network Node using Solar Energy and Phase Change Memory," (interactive presentation), *The IEEE conference on Design, Automation and Test in Europe*, Grenoble, France, March 2013.
- [IP-4] DATE Bo Zhao, Jun Yang, Youtao Zhang, Yiran Chen, and Hai Li, "Architecting a Common-Source-Line Array for Bipolar Non-Volatile Memory Devices," (interactive presentation), *The IEEE conference on Design, Automation and Test in Europe*, Dresden, Germany, March 2012.
- [P-5] PACT Ping Zhou, Bo Zhao, Youtao Zhang, Jun Yang, and Yiran Chen, "MRAC: A Memristor-based Reconfigurable Framework for Adaptive Cache Replacement," (poster), *The 20th International Conference on Parallel Architectures and Compilation Techniques*, Galveston Island, Texas, October 2011.
- [W-6] NSFNGS Youtao Zhang, Jun Yang and Weijia Li, "Towards Energy-Efficient Code Dissemination in Wireless Sensor Networks," *The Next Generation Software Workshop*, collocated with IPDPS, Florida, April 2008.
- [W-7] ASAP Youtao Zhang, Jun Yang, and Lan Gao, "Efficient Group Key Management with Tamper-resistant ISA Extensions," *IEEE 17th International Conference on Application-specific Systems, Architectures and Processors*, (Poster), Steamboat Springs, Colorado, September 2006.
- [W-8] WASSA Youtao Zhang, Jun Yang, Yongjing Lin, and Lan Gao, "Architectural Support for Protecting User Privacy on Trusted Processors," *The Workshop on Architectural Support for Security and Anti-Virus*, In conjunction with the 11th ASPLOS, Boston, MA, October 2004.
- [W-9] LCPC Bengu Li, Youtao Zhang and Rajiv Gupta, "Speculative Subword Register Allocation in Embedded Processors," *The 17th International Workshop on Languages and Compilers for Parallel Computing*, West Lafayette, Indiana, September 2004.

Invited Presentations

- "Designing Competitive Dense Phase Change Memory",
– ARM Research, Cambridge, UK, August 2015.
- "Are We Ready for PCM?",
– ESWeek 2011, ISSS+CODES Special Session, 2011.
- "The Emerging Secure Processor Designs",
– the Sixth Annual Emerging Information Technology Conference (EITC), August 2006.
- "Interleaved Authentication for Filtering False Reports in Multipath Routing based Sensor Networks",
– School of Information Sciences, University of Pittsburgh, 2006, Pittsburgh.
- "Enhancing Computer Security through Architectural Designs",
– Department of Computer Science and Technology, Nanjing University, 2005, China.
- "Enhancing Computer Security through Architectural and Compilation Designs",
– Computer Science Department, University of Pittsburgh, 2005, Pittsburgh.
- "The Design and Implementation of Compression Techniques for Profile Guided Compilation",
– CS Department, University of Texas at Dallas, 2002,
– CS Department, University of California at Davis, 2002,
– CSE Department, University of Connecticut, 2002,
– CS Department, State University of New York, Binghamton, 2002.

GRANTS

- [1] NSF, co-PI, (PI: Prof. Jun Yang, University of Pittsburgh), \$400,000, “SHF: Small: Approximate-Computing Enabled Robust 3D NAND Flash Memories,” 7/1/2017-6/30/2020.
- [2] NSF, co-PI, (PI: Prof. Jun Yang, University of Pittsburgh), \$450,000, “SHF: Small: Architectural Support for Reliable ReRAM Crossbar Memory,” 7/1/2016-6/30/2019.
- [3] NSF, co-PI, (PI: Prof. Kirk Pruhs, University of Pittsburgh), \$399,910, “AitF: EXPL: Data Management in Domain Wall Memory-based Scratchpad for High Performance Mobile Devices,” 9/1/2015-8/31/2018.
- [4] NSF, co-PI, (PI: Prof. Jun Yang, other co-PI: Prof. Bruce R. Childers, University of Pittsburgh), \$473,999, “SHF: Small: A Brick in the Wall: Achieving Yield, Performance and Density Effective DRAM Beyond 22nm Technology,” 7/15/2014-7/14/2017.
- [5] NSF, co-PI, (PI: Prof. Bruce Childers, other co-PIs: Prof. Sangyeun Cho, Prof. Daniel Mossé, Prof. Rami Melhem, Prof. Jun Yang, University of Pittsburgh), \$1,928,126, “CSR: Large: Storage Class Memory Architecture for Energy Efficient Data Centers,” 7/1/2010-6/30/2014.
- [6] CRDF, University of Pittsburgh, PI, \$16,000, “Scalable Memory System Designs for Next Generation Chip-Multiprocessors,” 7/1/2010-6/30/2012.
- [7] Google, Android Education, Donation of 5 Verizon DROID phones, “Experimenting Effective Code Update Techniques for Android”, 2010.
- [8] NSF, co-PI, (PI: Prof. Jun Yang, ECE Department, University of Pittsburgh), \$120,000, “CSR-CSI: An Update-conscious Compilation Framework for Energy-Efficient Code Dissemination in Wireless Sensor Networks”, 9/1/2007-8/31/2009.
- [9] NSF CAREER Award, PI, \$400,000, “A Compilation Framework for the Development of High Performance Secure Applications on Trusted Processors”, 01/2005-12/2009.
- [10] Emmitt Project, PI, \$45,000, University of Texas at Dallas, “Architectural support for enhancing security”, 6/2005-8/2006.
- [11] NSF, PI, \$26,000, “Collaborative: Architectural Support for Security and Privacy Protection on Uni- and Multi-Processors”, (PI: Prof. Jun Yang, CSE Department, University of California at Riverside), 11/2004-10/2005.

MEMBERSHIP

- ACM, IEEE, IEEE computer society.

II. TEACHING

TEACHING EXPERIENCE

University of Pittsburgh

- CS2210 Compiler Construction (graduate level), Spring 2006-2014
- CS3220 Compiler Techniques for Parallel Systems, Fall 2007
- CS1621 Structure of Programming Languages, Fall 2007, 2009
- CS1622 Introduction to Compiler Design, Fall 2008, 2010
- CS0441 Discrete Mathematics, Spring 2009
- CS0447 Computer Organization and Assembly Language Programming, Fall 2006, 2014

University of Texas at Dallas

- CS6353 Compiler Construction (graduate level), Spring 2003, 2004, 2005, Fall 2005
- CS4348 Operating System Concepts (undergraduate level), Spring 2003, 2005
- CS5348 Operating System Concepts (graduate level), Fall 2003, 2004, Spring 2005

STUDENTS

As the degree committee chair/co-chair

- Lei Zhao, PhD student, University of Pittsburgh
- Yuyu Zhou, PhD student, University of Pittsburgh
- Rujia Wang, PhD student, co-advised with Prof. Jun Yang, ECE Department, University of Pittsburgh.

- Xianwei Zhang, PhD in 2017, University of Pittsburgh
Recipient of Andrew Mellon Pre-doctoral Fellowship for 2016-2017
First job: AMD Research.
- Lei Jiang, PhD in 2014, co-advised with Prof. Jun Yang, ECE Department, University of Pittsburgh.
Current job: Assistant Professor at the Indiana University of Bloomington
- Yi Xu, PhD in 2012, co-advised with Prof. Jun Yang, CoE program, University of Pittsburgh.
Current job: Assistant Professor at Macau University of Science and Technology
- Ping Zhou, PhD in 2012, co-advised with Prof. Jun Yang, CoE program, University of Pittsburgh.
Current job: Intel Inc.
- Weijia Li, PhD in 2011, University of Pittsburgh.
Recipient of Andrew Mellon Pre-doctoral Fellowship for 2010-2011
First job: Conviva Inc.

- Mengmeng Li, MS in 2013, University of Pittsburgh. First job: Facebook.com.
- Yang Hu, MS in 2011, University of Pittsburgh. First job: Amazon.com.
- Mohammed Mohammed, MS in 2009, University of Pittsburgh.
- Hai T Vu, MS in 2005, University of Texas at Dallas.

III. SERVICE

PROFESSIONAL ACTIVITIES

Steering Committee Chair

- Chair, ACM SIGPLAN Conference on Languages, Compilers and Tools for Embedded Systems, 2015 – .

General Chair

- Co-chair, the 28th IEEE International Performance Computing and Communication Conference (IPCCC), December 2009.
- Chair, ACM SIGPLAN Conference on Languages, Compilers and Tools for Embedded Systems, June 2014.

Program Chair

- The 27th IEEE International Performance Computing and Communication Conference (IPCCC), December 2008.
- The 13th Workshop on Interaction between Compilers and Computer Architectures (Interact-13), February 2009.

Guest Editor

- Journal of Embedded Computing (JEC), Special issue on Embedded System Optimization, Volume 3, Issue 1, 2009.

Publication Chair

- The International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010, 2011.

Local Arrangement Chair

- The International Conference on Parallel Processing (ICPP), 2012.

TPC Membership

- ACM Design Automation Conference (DAC), 2017.
- IEEE/ACM International Conference On Computer Aided Design (ICCAD), 2015, 2016, 2017.
- ACM SIGPLAN Conference on Languages, Compilers and Tools for Embedded Systems(LCTES), 2004, 2010, 2013.
- ACM the 28th Symposium On Applied Computing, Programming Languages (PL) Track, 2013, 2014.
- IEEE 8th International Conference on Networking, Architecture, and Storage (NAS), 2013.
- IEEE/IFIP the 42nd Annual International Conference on Dependable Systems and Networks (DSN), 2012.
- IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS), 2012.
- IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2011.
- The 29th IEEE International Performance Computing and Communication Conference (IPCCC), 2010, 2011.
- The Second IEEE International Symposium on Advanced Topics on Embedded Systems and Applications (ESA), 2011.
- The 9th International Symposium on Embedded Computing (EmbeddedCom), 2011.
- ACM SIGPLAN Conference on Languages, Compilers and Tools for Embedded Systems(LCTES), 2004, 2010.
- IEEE International Conference on Information Reuse and Integration (IRI), 2006, 2007, 2008, 2009, 2010, 2011.
- The International Conference on Embedded Software and System (ICCESS), 2004, 2005, 2009, 2010, 2015, 2016.
- IASTED International Conference on Parallel and Distributed Computing and Networks (PDCN), 2005, 2006, 2007, 2008, 2009, 2010.
- International Symposium on Data, Privacy, and E-Commerce (ISDPE), 2007, 2010.
- International Conference on Embedded and Multimedia Computing (EM-COM), 2009.
- IEEE the International Symposium on Embedded Computing (SEC), 2007, 2008.
- IEEE International Conference on Computer Communications and Networks (ICCCN), 2007.
- IFIP International Conference on Embedded And Ubiquitous Computing (EUC), 2005, 2006.
- ACM/IEEE International Symposium on Code Generation and Optimization (CGO), 2005.

Panelist and Reviewer

- NSF Panelist: XPS (2015), SHF (2009), CRI (2008), CPA (2008), SoD (2006), CyberTrust (2005), ITR (2003).
- Reviewer for Estonian Science Foundation, 2010.
- Reviewer for Indiana State the 21st Century S&T Fund, 2006.
- Reviewer for many journals and conferences.

DEPARTMENT SERVICE

University of Pittsburgh

- Graduate Programs and Examinations Committee, Fall 2008 – present.

- Graduate Assessment Committee, Fall 2009 – present.
- School of Information Science, Faculty Search Committee, Spring 2010.
- Graduate admission and financial aid committee, Fall 2007 – Spring 2008.
- Undergraduate advising committee, Fall 2006 – Spring 2007.

University of Texas at Dallas

- Department Equipment Committee, Fall 2003 – Fall 2005.
- Computer Engineering Graduate Admission Committee, Spring 2004 – Fall 2005.