

Curriculum Vita

Xiao Qin

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1. Personal Information

1.1 Research Interests

Parallel/Distributed Systems, Storage Systems, Cluster and Grid Computing, Real-time Systems, Fault-tolerant Computing, Performance Evaluation, and Dynamic Resource Management.

1.2 Education

Ph.D. in Computer Science, University of Nebraska-Lincoln, Lincoln, NE, August 2004
M.S. in Computer Science, Huazhong University of Science and Technology, China, June 1999
B.S. in Computer Science, Huazhong University of Science and Technology, China, June 1996

1.3 Employment

2015 – Present: Professor

Department of Computer Science and Software Engineering
Auburn University.

2010 – 2015: Associate Professor

Department of Computer Science and Software Engineering
Auburn University.

2007 – 2010: Assistant Professor

Department of Computer Science and Software Engineering
Auburn University.

2004 - 2007: Assistant Professor

Department of Computer Science.
New Mexico Institute of Mining and Technology,

1.4 Honors and Awards

- Junior Faculty Research Award - Auburn Alumni Engineering Council, 2010.
- NSF CAREER Award - U.S. National Science Foundation, 2009.
- Best Paper Award, *the 9th IEEE International Conference on Embedded Software and Systems*, Liverpool, UK, June 2012.
- Best Paper Award, *IEEE/ACM International Conference on Green Computing and Communications*, Dec. 2010.
- Best Paper Award, *IEEE Symposium on Computers and Communications*, July 2008.
- NSF Computer Systems Research (CSR) Award - U.S. National Science Foundation, 2007.
- NSF Computing Processes & Artifacts (CPA) Award - U.S. National Science Foundation, 2007.

- Best Poster Award - Workshop on Secure Distributed Information Infrastructure, 2001.
- Research Excellence Award - Griffith University, Australia, 2000-2001.
- Postgraduate Research Scholarship - Australian Research Council, 2000-2001.
- Outstanding Research Award - Huazhong Univ. of Sci. and Tech. (HUST), China, 1999.
- Siemens Graduate Fellowship - 1997-1998.
- Outstanding Graduate Award - HUST 1996.

1.5 Students' Honors and Awards

- Xunfei Jiang – Distinguished Dissertation Award. **One of the three award winners** of the 2016 Auburn University Graduate School.
- Xunfei Jiang – Auburn University Outstanding Doctoral Student Award 2013-2014. **One of the 10 award winners** at Auburn University.
- Ji Zhang - Departmental Fellowship, Samuel Ginn College of Engineering - Auburn University, 2010-2013.
- Xunfei Jiang - Student Travel Award, Auburn University Graduate School, 2012.
- Xunfei Jiang - Student Travel Award, Auburn Cyber Research Center, 2012.
- Ji Zhang – Best Poster Award (2nd Place), Samuel Ginn College of Engineering - Auburn University, 2011.
- Joshua Lewis – Departmental Fellowship, Samuel Ginn College of Engineering - Auburn University, 2011.
- Joshua Lewis – Outstanding Student Award 2011. **One of the 12 award winners** in the College of Engineering at Auburn University.
- Tao Xie – **NSF CAREER Award** Winner, 2009.
- Ziliang Zong – Distinguished Dissertation Award. **One of the three award winners** of the 2010 Auburn University Graduate School.
- Tao Xie – Faculty Research Award, San Diego State University, 2010.
- Shu Yin – NSF Student Travel Award, *the 11th Int'l Conf. Cluster Computing* (Cluster'09), New Orleans, Sept. 2009.
- Adam Manzanares – Recipient of a GANN Fellowship, Aug. 2007 - May 2010.
- Kiranmai Bellam – New Mexico Tech 2007 Spring Graduate Student Travel Grant, April 2007.
- Mais Nijim – IEEE Student Travel Award, *the 15th Int'l Conf. Computer Communications and Networks* (ICCCN), Oct. 2006.
- Mais Nijim – Student Travel Award, Academic Affairs, New Mexico Tech, Oct. 2006.
- Ziliang Zong – IEEE Technical Committee on Scalable Computing (TCSC) Student Travel Award, *the 8th Int'l Conf. Cluster Computing*, Sept. 2006.
- Brian Stinar – IEEE Technical Committee on Scalable Computing (TCSC) Student Travel Award, *the 8th Int'l Conf. Cluster Computing*, Sept. 2006.
- Mais Nijim – New Mexico Tech 2006 Fall Graduate Student Travel Grant, Sept. 2006.
- Mohammed Alghamdi – 2006 Summer Student Award, Ministry of Higher Education of Saudi Arabia, Aug. 2006.
- Mohammed Alghamdi – 2006 Spring Student Award, Ministry of Higher Education of Saudi Arabia, May 2006.
- Adam Manzanares – B.S. with Honors in Computer Science, May 2006.
- Mais Nijim - New Mexico Tech 2006 Spring Graduate Student Travel Grant, April 2006.
- Tao Xie – New Mexico Tech 2006 Spring Graduate Student Travel Grant, April 2006.
- Mohammed Alghamdi – Excellence in Education Award, Royal Embassy of Saudi Arabia in the U.S., 2005.
- Tao Xie – IEEE Technical Committee on Scalable Computing (TCSC) Student Travel Award, *the 7th Int'l Conf. Cluster Computing*, Sept. 2005.
- Tao Xie – ACM Student Travel Award, *the 19th ACM International Conference on Supercomputing*, USA, June 2005.
- Tao Xie – New Mexico Tech 2005 Fall Graduate Student Travel Grant, Sept. 2005.
- Tao Xie – New Mexico Tech 2005 Summer Graduate Student Travel Grant, May 2005.

- Tao Xie – IEEE Technical Committee on Parallel Processing (TCPP) Student Travel Award, IPDPS'05, April 2005.

2. Research, Scholarly, and Creative Activities

2.1 Research Experience

08/2009-Present, NSF CAREER Project Auburn University

Multicore-Based Parallel Disk Systems for Large-Scale Data-Intensive Computing

To improve disk I/O performance, one may integrate multicore processors with parallel disk systems. Unfortunately, architectures and data processing algorithms for multicore-based parallel disk systems are still in their infancy. This motivates us to develop novel architectures for parallel disk systems, where significant multicore processing power and memory are integrated into parallel disk drives. This CAREER project provides the first parallel disk system in which large parts of data and I/O processing are offloaded to multicore processors, embedded in disk drives. The proposed techniques and mechanisms are highly adaptive to dynamic workloads with both large and small disk requests, making modern parallel disk systems leverage multicore processors for better performance and scalability. The overall objective of this CAREER Development project is to build hardware and software parallel disk architectures that put substantial multicore computing power on disks. The research consists of three basic tasks: (1) designing hardware and software architectures for multicore-based parallel disk systems, (2) developing multicore-based data processing techniques, and (3) building software performance models and an analysis toolkit. The educational plan include: (1) establishing a storage systems laboratory; (2) developing new courses; (3) implementing the concept of a mini-conference to educate students; and (4) increasing underrepresented student involvement in research activities. In addition, the project would benefit society by developing hardware and software modules for next-generation parallel disk systems, where multicore processors and disk drives are tightly integrated to boost disk I/O performance.

06/2009-Present, NSF CCLI Project Auburn University

QoSec: A Novel Middleware-Based Approach to Teaching Computer Security Courses

This project develops QoSec, an extensible middleware framework for computer security course projects. The QoSec framework provides learning materials for undergraduate students related to the design of large-scale trustworthy computer systems. Course projects in QoSec are implemented as plug-in modules of a middleware-based framework. The QoSec framework is the first educational material of its kind designed specifically to teach undergraduate students how to make real-world computing systems more accountable and less vulnerable to attacks. The project creates a novel middleware-based approach to teaching undergraduate students how to develop large-scale secure software. QoSec addresses several challenges of contemporary computer security education including the lack of novel approaches to study real-world secure computer systems; the need of a holistic platform for constructing computer security projects; and the challenge of using commercial middleware-based frameworks to teach introductory computer security classes. QoSec has an easy interface which allows teaching students the rapid development of security-critical software.

07/2007-Present, NSF CPA Project, Auburn University

BUD: A Buffer-Disk Architecture for Energy Conservation in Parallel Disk Systems

Parallel disks consisting of multiple disks with high-speed switched interconnect are ideal for data-intensive applications running in high-performance computing systems. Improving the energy efficiency of parallel disks is an intrinsic requirement of next generation high-performance computing systems, because a storage subsystem can represent 27% of the energy consumed in a data center. However, it is a major challenge to conserve energy for parallel disks and energy efficiently coordinate I/Os of hundreds or thousands of concurrent disk devices to meet high-performance and energy-saving requirements. This research investigates novel energy conservation techniques to provide significant energy savings while achieving low-cost and high-performance for parallel disks. In this research project, the investigators take an organized approach to implementing energy-saving techniques for parallel disks, simulating energy-efficient parallel disk systems, and conducting a physical demonstration. This research involves four tasks:

(1) design and develop a buffer-disk (BUD) architecture to reduce energy dissipation in parallel disk systems; (2) develop innovative energy-saving techniques, including an energy-related reliability model, energy-aware data partitioning, disk request processing, data movement, data placement, prefetching strategies, and power management for buffer disks; (3) implement a simulation toolkit (BUDSIM) used to develop a variety of energy-saving techniques and their integration in the BUD architecture; and (4) validate the BUD architecture along with our innovative energy-conservation techniques using real data-intensive applications running on high-performance clusters. This research can benefit society by developing economically attractive and environmentally friendly parallel disk systems, which are able to lower electricity bills and reduce emissions of air pollutants. Furthermore, the BUD architecture and the energy-conservation techniques can be transferable to embedded disk systems, where power constraints are more severe than conventional disk systems.

07/2007-Present, NSF CSR Project, Auburn University

MINT: Mathematical Reliability Models for Energy-Efficient Parallel Disk Systems

The MINT project aims at developing mathematical reliability models for fault-tolerant energy-aware disk systems. Reliability models, which are used to estimate reliability, have been important tools in the design and development of fault-tolerant computer systems. In the past decade, a variety of practical and useful reliability models have been constructed for disk systems. However, most of these models were developed for non-energy efficient disk systems, thereby making it difficult to apply the existing reliability models to energy-aware disk systems. Therefore, the overall objective of this project is to address the mathematical underpinnings of modeling reliability of energy-efficient parallel disk systems, where fault tolerance and energy-saving techniques will be seamlessly integrated together to conserve energy without sacrificing reliability in parallel disk systems.

08/2004 – 06/2007, New Mexico Institute of Mining and Technology.

Assistant Professor, Department of Computer Science.

- **Scheduling in Energy-Efficient Computing Systems:** With the advances of computing technology, the demand on computing systems for high performance and low energy consumption exponentially increases. Next-generation computing systems require innovative energy-efficient scheduling techniques for resource management. In this project, new job and packets scheduling algorithms are designed and implemented for embedded systems, cluster computing platforms, and wireless networks. The algorithms are aimed at achieving the best tradeoffs between energy conservation and high performance for energy-efficient computing systems. The algorithms are evaluated through extensive experiments based on both synthetic benchmark/traces and real-world applications.
- **Power-Aware Real-time Disk Scheduling:** This research is aimed at developing scheduling techniques to achieve an optimal tradeoff between power consumption and performance for I/O-intensive tasks in heterogeneous embedded systems. It integrates real-time, energy conservation, heterogeneity, diversity of I/O devices, and resource management into a unified and dynamic environment, like distributed robots.
- **Security-Aware Real-time Scheduling:** In addition to identifying the open issues and challenges involved in developing security-aware real-time scheduling schemes, we proposed a collection of novel real-time scheduling policies, which consider both security and real-time constraints for parallel and distributed systems.

08/2001 – 07/2004, University of Nebraska-Lincoln.

Research Assistant, Department of Computer Science and Engineering.

- **Dynamic Load Balancing for I/O-Intensive Applications:** developed an I/O-aware dynamic load-balancing scheme and its variations to improve overall performance of I/O-intensive applications running on time-shared clusters, and evaluated the performance of the proposed load-balancing schemes by conducting extensive trace-driven simulations.
- **Real-time and Fault-tolerant Scheduling in Distributed Systems:** designed and examined a family of new fault-tolerant scheduling policies for real-time tasks with precedence constraints in a distributed system, and showed that the proposed policies can effectively guarantee the completion of a scheduled task before its deadline in the presence of a single processor's permanent failure.

- **Reliability Cost Driven Scheduling**: proposed a reliability cost driven scheduling scheme that schedules tasks with precedence constraints on a heterogeneous cluster, and conducted extensive experiments through simulations to show that the proposed scheme significantly outperforms two existing approaches that are not reliability driven.
- **A Cost-Effective, Fault-Tolerant Parallel Virtual File System**: designed and analyzed a cost-effective and fault-tolerant parallel virtual file system (CEFT-PVFS) that has been implemented on the PrairieFire supercomputer at UNL.

07/2000 – 07/2001, Griffith University, Australia.

Research Assistant, School of Computing and Information Technology.

- **A Real-Time Collaborative Editing System with Fault-Tolerance**: presented a recovery scheme in which, if a failure occurs in the Internet links or at a site, the site can rejoin the collaborative editing system by loading the local document state instead of obtaining the state from the remote sites. Compared with the existing schemes that have to regain the document state from other peer sites, the proposed approach delivers better performance in a wide area network environment.

07/1999 – 06/2000, Huazhong University of Science and Technology, China.

Research Assistant, Department of Computer Science and Engineering.

- **Fault-tolerant Scheduling for Real-time Sequential Jobs**: developed a fault-tolerant scheduling scheme and its variants for real-time jobs that are mutually independent, and conducted comprehensive performance evaluation to show that the proposed policies significantly improve the dependability of heterogeneous clusters.

02/1996 – 06/1999, Huazhong University of Science and Technology, China.

Research Assistant, Department of Computer Science and Engineering.

- **Fault-tolerant Support for Real-time and Distributed Systems**: proposed a framework for fault-tolerant scheduling in real-time distributed systems, and designed a series of fault-tolerant scheduling schemes for real-time and distributed systems.
- **Real-time I/O Scheduling in a Distributed Operating System**: designed a real-time I/O subsystem in a distributed UNIX system, and implemented a real-time disk I/O scheduling algorithm that improves the overall system performance.

2.2 Research Grants and Contracts

2.2.1 Funded Research Projects

(Note: Qin is currently serving as a **PI or Lead PI of nine NSF Grants of \$1,722,992** awarded after Qin joined Auburn University in July 2007. The NSF grants include an **NSF CAREER Award**. In addition, Qin is serving as a Co-PI of four NSF grants of \$1,162,180.)

- Total Funding (PI) **\$2,078,555**
 - Total External Funding (PI) **\$1,878,267** (Research Grants: \$2,001,280 + Equipment: 77,275)
 - Total Internal Funding (PI) \$200,288
 - Total Funding (co-PI) \$1,162,180
 - Total Funding (PI and Co-PI) **\$3,240,735**
1. (PI) National Science Foundation (NSF) - CISE/CCF, Research Experiences for Undergraduates (REU-CCF-0845257)
Duration: 9/2012-8/2016
Award Amount: \$48,000
 2. (PI) National Science Foundation (NSF) - CISE/CCF, Research Experiences for Undergraduates (REU-CNS-0917137)
Duration: 9/2010-8/2014
Award Amount: \$48,000

3. (PI) **NSF CAREER Award**, CCF-0845257.
 "CAREER: Multicore-Based Parallel Disk Systems for Large-Scale Data-Intensive Computing"
 Duration: 8/2009 – 7/2016
 Award Amount: \$400,000
4. (Lead PI) NSF CNS-Core Program, CNS-0917137.
 "CSR:Small:Collaborative Research: FastStor: Data-Mining-Based Multilayer Prefetching for Hybrid Storage Systems"
 Duration: 9/2009 – 8/2014
 Auburn Co-PIs: Wei-Shinn Ku
 Award Amount: \$200,000
 Total Award Amount: \$562,994.
 In collaboration with Ziliang Zong and Manuel L. Penaloza at South Dakota School of Mines and Technology (\$200,000) and Mais Nijim at the University of South Mississippi (\$99,994)
5. (PI) King Abdulaziz City for Science and Technology (KACST) Research Grant
 Note: KACST is the Saudi Arabian National Science Agency
 "Software Performance Analysis Models for Data-Intensive Computing"
 Duration: 5/2010 – 8/2013
 Award Amount: \$43,000
6. (PI) NSF DUE-CCLI Program, DUE-0837341.
 "QoSec: A Novel Middleware-Based Approach to Teaching Computer Security Courses"
 Duration: 9/2009 – 8/2012
 Co-PIs: John A. "Drew" Hamilton, Jr., Kai Chang, and Wei-Shinn Ku.
 Award Amount: \$149,999
7. (PI) National Science Foundation (NSF) – CISE/CNS, CSR Program, CNS-0757778.
 "Mathematical Reliability Models for Energy-Efficient Parallel Disk Systems"
 Duration: 9/2007 – 8/2010
 Award Amount: \$150,000
8. (PI) National Science Foundation (NSF) - CISE/CCF, CPA Program, CCF-0742187.
 "BUD: A Buffer-Disk Architecture for Energy Conservation in Parallel Disk Systems"
 Duration: 6/2007 – 5/2010
 Co-PIs: Peter C. Lichtner, LANL; Tao Xie, SDSU.
 Award Amount: \$299,999
9. (PI) National Science Foundation (NSF) - CISE/CNS, Research Experiences for Undergraduates (REU) Supplemental Grant (supplement to grant CNS-0757778)
 Duration: 10/2008 – 9/2009
 Award Amount: \$28,000
10. (PI) National Science Foundation (NSF) - CISE/CCF, Research Experiences for Undergraduates (REU) Supplemental Grant (supplement to grant CCF-0742187)
 Duration: 9/2008 – 8/2010
 Award Amount: \$36,000
11. (PI) Auburn University Start-Up Grant
 "High-Performance Storage Systems"
 Duration: 8/2007 – 6/2012
 Award Amount: \$110,288
12. (PI) Intel Research Grant/Award
 "SECS: Scheduling in Energy-Efficient Computing Systems"
 Duration: 9/2005 – 8/2008

Award Amount: \$58,000

13. (PI) Altera Corporation University Program, Equipment Grant
"An Energy-Delay Tunable Task Allocation Strategy for Embedded Systems"
Duration: 2/2007 – 1/2008
Award Amount: \$9,105
14. (PI) Internal Intel Research Grant
"Development of a Simulator for Cluster Storage Systems using Intel Based Mac Mini Computers"
Duration: 4/2007 – 3/2008
Co-PI: Yiming Yang, Intel Corporation
Award Amount: \$4,000
15. (PI) New Mexico Tech Start-Up Grant
"SARTS: Security-Aware Real-Time Systems"
Duration: 8/2004 – 6/2007
Award Amount: \$80,000
16. (PI) Xilinx University Program, Equipment Grant
"Energy-Efficient Embedded Systems"
Duration: 8/2006 – 7/2007
Award Amount: \$6,170
17. (PI) Huazhong University of Science and Technology Research Grant
"MIND: Modeling Energy Consumption for RAID5 Disk Arrays"
Duration: 5/2009 – 8/2016
Award Amount: \$32,000 (Approximate)
18. (PI) Wuhan University of Technology Research Grant
"Design and Modeling of Distributed Intelligent Transportation Systems"
Duration: 5/2006 – 6/2006
Co-PI: Shengjun Xue, WUT
Award Amount: \$3,000
19. (PI) New Mexico Tech Presidential Research Grant
"Adaptive Quality of Security Control in Storage Systems"
Duration: 8/2005 – 7/2006
Award Amount: \$10,000
20. (co-PI) National Science Foundation (NSF) - Cyber Trust grant, CNS-0831502
PI: Wei-Shinn Ku; Co-PIs: John A. "Drew" Hamilton, Jr., Xiao Qin, and Haixun Wang.
"SPEAR: Space Encryption based Query Processing for Privacy-Aware Location-based Services"
Duration: 8/2008-7/2011
Award Amount: \$199,999
21. (co-PI) National Science Foundation (NSF) - CI-TEAM grant, OCI-0753305
PI: John A. "Drew" Hamilton, Jr.; Co-PIs: Kai Chang, Xiao Qin, and Wei-Shinn Ku.
"Collaborative Project: CI-TEAM Implementation Project: A Digital Forensics Cyberinfrastructure Workforce Training Initiative for America's Veterans"
Duration: 8/2008-7/2011
Award Amount: \$299,636
22. (co-PI) National Science Foundation (NSF)
PI: Wei-Shinn Ku; Co-PIs: Xiao Qin, Shiwon Mao, and Alvin Lim
"II-NEW: An Infrastructure for Scalable Data Dissemination and Query Evaluation in Mobile Environments"

Award Amount: \$164,678

23. (co-PI) NSF SFS grant, DUE-0830831.
PI: John A. "Drew" Hamilton, Jr.; Co-PIs: Kai Chang, Xiao Qin, and Wei-Shinn Ku.
"Collaborative Research: Building Information Assurance Education Capacity"
Duration: 8/2008-7/2011
Award Amount: \$174,740
24. (co-PI) National Science Foundation (NSF) - REU-Site grant, CNS-0851960
PI: Saad Biaz; Co-PIs: Wei-Shinn Ku and Xiao Qin.
"REU Site for Pervasive and Mobile Computing"
Duration: 5/2009-4/2012
Award Amount: \$323,127

2.3 Publications

(Note: Students, postdoctoral researchers, and visiting scholars are marked with *. Percentage of effort and number of pages of papers are listed at the end of each item. For example, (40%, 14 pages) of a paper means the percentage of effort that Xiao Qin devoted to the paper is 40%; the paper has 14 pages.)

2.3.1 Refereed Book Chapters

1. X.-F. Jiang*, J. Zhang*, **X. Qin**, M. Qiu, M.-H. Jiang*, and J.-F. Zhang*, "Thermal Modeling and Management of Storage Systems in Data Centers", Handbook on Data Centers, Springer, 2014. (40%, 32 pages)
2. Y. Tian*, M. I. Alghamdi*, X.-J. Ruan*, J. Xie*, and **X. Qin**, "Towards a Secure Fragment Allocation of Files in Heterogeneous Distributed Systems", Scalable Computing and Communications: Theory and Practice, edited by Samee U. Khan, Albert Y. Zomaya, and Lizhe Wang, John Wiley & Sons, Sept. 2012. (40%, 26 pages)
3. S. Yin*, X.-J. Ruan*, J. Xie*, Y. Tian*, and **X. Qin**, "ROD: A Practical Approach to Improving Reliability of Energy-Efficient Parallel Disk Systems", Energy Aware Distributed Computing Systems, edited by Albert Y. Zomaya and Young-Choon Lee, Wiley Series on Parallel and Distributed Computing, May 2011. (40%, 12 pages)
4. Z.-L. Zong*, X.-J. Ruan*, A. A. Manzanaraes*, K. Bellam*, and **X. Qin**, "Improve Energy-Efficiency of Computational Grids", Handbook of Research on P2P and Grid Systems for Service-Oriented Computing: Models, Methodologies and Applications, Information Science Reference, 2010. (40%, 12 pages)
5. **X. Qin** and H. Jiang, "Data Grids: Supporting Data-Intensive Applications in Wide Area Networks," *High Performance Computing: Paradigm and Infrastructure*, pp. 481-494, edited by Laurence T. Yang and Minyi Guo, John Wiley and Sons, spring, 2005. (90%, 14 pages)

2.3.2 Refereed Journal Papers

(Note: **66 journal papers have been published or accepted since Qin joined Auburn University in July 2007. 83** published or accepted for publication. **28 in IEEE Transactions, 8 in ACM Transactions and journals, 6 in JPDC**, 4 in FGCS, 4 in CLUSTER, 1 in JNCA, 1 in JSA, 1 in JSS, and 1 in Parco. 2 papers have been revised for the second round review at *IEEE Transactions*.)

6. Y.-H. Deng, J.-M. Cai, W. Jiang, and **X. Qin**, "Employing Dual-Block correlations to Reduce the Energy Consumption of Disk Drives," *Computing*, In Press, 2016. (**Impact Factor: 0.59**) (15%, 19 pages)
7. J. Zhang*, X.-F. Jiang*, W.-S. Ku, and **X. Qin**, "Efficient Parallel Skyline Evaluation using MapReduce," *IEEE Transactions on Parallel and Distributed Systems*, vol. 27, In Press, 2016. (**Impact Factor: 2.17**) (25%, 14 pages)

8. J.-F. Zhang, X.-L. Yu*, Y.-H Li*, S.-L. Zhang, Y.-L. Xun*, and **X. Qin**, "A relevant Subspace based Contextual Outlier Mining Algorithm," *Knowledge-Based Systems*, vol. 97, In Press, 2016. (**Impact Factor: 2.95**) (10%, 12 pages)
9. M. Assaf*, X.-F. Jiang*, M. Abid, and **X. Qin**, "IPODS: Informed Prefetching for Distributed Storage System," *Journal of Signal Processing*, In Press, 2016. (40%, 13 pages)
10. Y. Xun*, J. Zhang, and **X. Qin**, "FiDooop: Parallel Mining of Frequent Itemsets Using MapReduce," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 46, no. 3, pp. 313-325, March 2016. (30%, 13 pages)
11. A. Chavan*, M. I. Alghamdi*, X.-F. Jiang*, **X. Qin**, J.-F. Zhang, M.-H. Jiang, and M. Qiu, "TIGER: Thermal Aware File Allocation in Storage Clusters," *IEEE Transactions on Parallel and Distributed Systems*, vol. 27, no. 2, pp. 558-573, Feb. 2016. (**Impact Factor: 2.17**) (40%, 15 pages)
12. X.-G. Zhao*, T. Peng*, **X. Qin**, Q.-P. Hu, L. Ding, and Z.-J Fang, "Feedback Control Scheduling in Energy-Efficient and Thermal-Aware Data Centers," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 46, no. 1, pp. 48-60, 2016. (40%, 13 pages)
13. M. Qiu, Z. Chen, J.-W. Liu, Z.-L. Zong*, G. Quan, **X. Qin**, and L. T. Yang, "Data Allocation for Hybrid Memory with Genetic Algorithms," *IEEE Transactions on Emerging Topics in Computing*, vol. 3, no. 4, pp. 544-555, 2015. (20%, 12 pages)
14. J.-W. Liu, Z. Ming, M. Qiu, H. Su, Z.-H. Gu, and **X. Qin**, "Defending Jamming Attack in Wide-Area Monitoring System for Smart Grid," *Telecommunication Systems*, vol. 53, pp. 159-167, 2015. (**Impact Factor: 1.163**) (10%, 9 pages)
15. Y.-P Chai, Z.-H Du, **X. Qin**, and D. Bader, "WEC: Improving Durability of SSD Cache Drives by Caching Write Efficient Data," *IEEE Transactions on Computers*, vol. 64, no. 11, pp. 3304-3316, Nov. 2015. (**Impact Factor: 4.55**) (30%, 13 pages)
16. J. Zhang*, X.-F. Jiang*, **X. Qin**, W.-S Ku, and M. I. Alghamdi*, "Frog: A Framework for Context-Based File Systems," *ACM Transactions on Storage*, vol. 11, no. 3, Article No. 11, 2015. (**Impact Factor: 1.12**) (40%, 28 pages)
17. P. Xie*, J.-Z. Huang, Q. Cao, **X. Qin**, and C.-S. Xie, "A New Non-MDS RAID6 Code to Support Fast Reconstruction and Balanced IOs," *The Computer Journal*, vol. 58, Feb 2015. (**Impact Factor: 1.024**) (20%, 20 pages)
18. J.-Z Huang, **X. Qin**, X. Liang*, and C.-S. Xie, "An Efficient I/O-Redirection-based Reconstruction Scheme for Erasure-Coded Storage Clusters," *IEEE Transactions on Computers*, vol. 64, no. 11, pp. 3037-3050, Nov. 2015. (**Impact Factor: 4.55**) (40%, 14 pages)
19. J.-Z. Huang, Y. Wang*, **X. Qin**, X. Liang*, S. Yin*, and C.-S. Xie, "Exploiting Pipelined Encoding Process to Boost Erasure-Coded Data Archival," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 11, pp. 2984-2996, Nov. 2015. (**Impact Factor: 2.17**) (30%, 13 pages)
20. X.-M. Zhu, J.-J. Wang, **X. Qin**, and J. Wang, "Fault Tolerant Scheduling for Real Time Tasks on Multiple Earth Observation Satellites," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 11, pp. 3012-3026, Nov. 2015. (**Impact Factor: 2.17**) (30%, 15 pages)
21. H.-K. Chen*, X.-M. Zhu, J.-H. Zhu, and **X. Qin**, "Towards Energy-Efficient Scheduling for Real-Time Tasks under Uncertain a Cloud Computing Environment," *Journal of Systems and Software*, vol. 99, no. 1, pp. 20-35, Jan. 2015. (20%, 16 pages)
22. J.-Z. Huang, X.-H. Liang*, **X. Qin**, P. Xie*, and C.-S. Xie, "Scale-RS: An Efficient Scaling Scheme for RS-Coded Storage Clusters," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 6, pp. 1704-1717, 2015. (**Impact Factor: 2.17**) (40%, 14 pages)
23. J. Yuan, A.-X. Liu, X. Ma*, X.-L. Liu, **X. Qin**, and J.-F. Zhang*, "The G-Good-Neighbor Conditional Diagnosability of K-Ary N-Cubes under the PMC Model and MM* Model," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 4, pp. 1165-1177, 2015. (**Impact Factor: 2.17**) (20%, 13 pages)
24. J.-Z. Huang, X.-H. Liang*, **X. Qin**, Q. Cao, and C.-S. Xie, "PUSH: A Pipeline Reconstruction I/O for Erasure-Coded Storage Clusters," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 2, pp. 516-526, 2015. (**Impact Factor: 2.17**) (30%, 11 pages)
25. J.-Z. Huang, **X. Qin**, F.-H. Zhang*, W.-S. Ku, and C.-S. Xie, "MFTS: A Multi-level Fault-tolerant Archiving Storage with Optimized Maintenance Bandwidth," *IEEE Transactions on Dependable and Secure Computing*, vol. 11, no. 6, pp. 524-537, Nov./Dec., 2014. (**Impact Factor: 1.06**) (40%,

- 14 pages)
26. H. Sun*, **X. Qin**, H. Jiang, J.-Z. Huang, and C.-S. Xie, "RB-Explorer: An Accurate and Practical Approach to Write Amplification Measurement for SSDs," *IEEE Transactions on Computers*, vol. 64, no. 4, pp. 1133-1148, April, 2015. (**Impact Factor**: 4.55) (40%, 16 pages)
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2.3.3 Refereed Conference Papers

(Note: **75 conference papers** have been published or accepted since Qin joined Auburn University in July 2007. **121 papers** have been published or accepted for publication. **75 are in competitive referred conferences** and 46 are in other referred conferences and workshops. There is no page number for conference papers appeared in electronic proceedings.)

89. J. Zhang*, W.-S. Ku, X.-F. Jiang*, **X. Qin**, M.-T. Sun, and H. Lu, "A Framework for Multi-Criteria Optimal Location Selection," *Proc. the 23rd ACM Int'l Conf. Advances in Geographic Information Systems (ACM SIGSPATIAL'15)*, Demo Paper, Seattle, Washington, Nov. 2015. (**Acceptance Rate**: 59%) (10%)
90. Y.-Q. Chen*, M. I. Alghamdy*, **X. Qin**, J.-F. Zhang, M.-H. Jiang*, and M. Qiu, "TERN-A Self-Adjusting Thermal Model for Dynamic Resource Provisioning in Data Centers," *Proc. IEEE 17th International Conference on High Performance Computing and Communications*, New York, August 2015. (40%, 12 pages)
91. Y. Tian*, **X. Qin**, and Y.-F. Jia, "Secure Replica Allocation in Cloud Storage Systems with

- Heterogamous Vulnerabilities," *Proc. IEEE Int'l Conf. Networking, Architecture, and Storage*, Boston, MA, August 2015. (**Acceptance Rate:** 32%, 30/94) (40%, 8 pages)
92. S. Yin*, X. Li, K. Li, J.-Z. Huang, X.-J. Ruan*, X.-M. Zhu, and **X. Qin**, "REED: A Reliable Energy-Efficient RAID," *Proc. Int'l Conf. Parallel Processing*, Beijing, China, Sept. 2015. (**Acceptance Rate:** 32.5%, 99/305) (30%, 8 pages)
 93. X. Zhang*, W. Guo, Z.-H. Li, X.-N. Zhao, and **X. Qin**, "MLFS: A Multiple Layers Share File System for Cloud Computing," *Proc. IEEE Globecom Workshop on Cloud Computing Systems, Networks and Applications*, Austin, Texas, Dec. 2014. (**Acceptance Rate:** 39%, 27/68) (20%, 7 pages)
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 95. M. Qiu, L.-B. Chen, Y.-X. Zhu, J.-T. Hu, and **X. Qin**, "Online Data Allocation for Hybrid Memories on Embedded Tele-Health Systems," *Proc. 2014 IEEE International Conference on High Performance Computing and Communications (HPCC)*, Paris, France, Aug. 2014. (15%, 6 pages)
 96. X.-M. Zhu, J.-J. Wang, J. Wang, and **X. Qin**, "Analysis and Design of Fault-Tolerant Scheduling for Real-Time Tasks on Earth-Observation Satellites," *Proc. IEEE International Conference on Parallel Processing (ICPP)*, Sept. 2014. (20%, 10 pages)
 97. J. Liu*, Y.-P. Chai, **X. Qin**, and Y. Xiao, "PLC-Cache: Endurable SSD Cache for Deduplication-based Primary Storage," *Proc. the 30th IEEE Symposium on Massive Storage Systems and Technologies (MSST)*, June 2014. (**Acceptance Rate:** 27.5%, 30/109) (20%, 10 pages)
 98. J. Zhang*, W.-S. Ku, M.-T. Sun, **X. Qin**, and H. Lu, "Multi-Criteria Optimal Location Query with Overlapping Voronoi Diagrams," *Proc. the 17th International Conference on Extending Database Technology (EDBT)*, Athens, Greece, March 24-28, 2014. (**Acceptance Rate:** 19.5%, 52/266). (20%, 8 pages)
 99. X. Zhang*, W. Guo, Z.-H. Li, X.-N. Zhao, and **X. Qin**, "A Framework to Measure Storage Utilization in Cloud Storage Systems," *Proc. the 3rd International Workshop on Data Management for Emerging Network Infrastructure*, June 2014. (10%, 6 pages)
 100. J. Hood*, T. Scott*, J. Yu*, **X. Qin**, L. Yilmaz, and J. A. Hamilton, "We Didn't Start the Fire: Using Agent-Directed Thermal Modeler to Keep Servers Cool," *Proc. the Agent-Directed Simulation Symposium of the SpringSim Multiconference*, Tampa, Florida, April 2014. (25%, 8 pages)
 101. P. Xie*, J.-Z. Huang, Q. Cao, and **X. Qin**, "V²-Code: A New Non-MDS Array Code with Optimal Reconstruction Performance for RAID-6," *Proc. the IEEE International Conference on Cluster Computing*, Indianapolis, IN, USA, Sept. 23-27, 2013. (**Acceptance Rate:** 32%, 45/141) (25%, 8 pages)
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 103. X. Zhang*, W. Guo, **X. Qin**, and X.-N. Zhao, "A Highly Extensible Framework for Molecule Dynamic Simulation on GPUs," *Proc. the International Conference on Parallel and Distributed Processing Techniques and Applications*, July 22-25, 2013 (10%, 6 pages)
 104. J. Xie*, Y. Tian*, S. Yin*, J. Zhang*, X.-J. Ruan*, and **X. Qin**, "Adaptive Preshuffling in Hadoop Clusters," *Proc. the International Conference on Computational Science*, Barcelona, Spain, 5-7 June, 2013. (30%, 8 pages)
 105. J. Zhang*, W.-S. Ku, X.-F. Jiang*, and **X. Qin**, "A Spatial Keyword Evaluation Framework for Network-based Spatial Queries," *Proc. the 21st ACM International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL GIS 2013)*, Orlando, FL, USA, November 5-8, 2013. (**Acceptance Rate:** 7%, 16/228) (25%, 4 pages, Demo Paper)
 106. X. Zhang*, J.-J. Lu, and **X. Qin**, "Energy Consumption Characterization of Heterogeneous Servers," *Proc. the 8th ChinaGrid Annual Conference*, Changchun, China, Aug. 22-23, 2013. (20%, 8 pages)
 107. H. Sun*, X. Qin, F. Wu, and C.-S. Xie, "Measuring and Analyzing Write Amplification Characteristics of Solid State Disks," *Proc. the 21st IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS 2013)*, San Francisco, CA, USA, Aug. 14-16, 2013. (**Acceptance Rate:** 27%, 44/163) (50%, 10 pages)
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109. J. Zhang*, W.-S. Ku, X.-F* Jiang, **X. Qin**, and Y.-L. Hsueh, "Evaluation of Spatial Keyword Queries with Partial Result Support on Spatial Networks", *Proc. the 14th IEEE International Conference on Mobile Data Management (MDM)*, Milan, Italy, 2013. (25%, 4 pages)
 110. X.-F. Jiang*, J. Zhang*, M. I. Alghamdi*, **X. Qin**, M.-H. Jiang*, and J.-F. Zhang*, "PEAM: Predictive Energy-Aware Management for Storage Systems", *Proc. the 8th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 2013. (40%, 10 pages)
 111. X. Zhang, J.-J. Lu, and **X. Qin**, "BFPEM: Best Fit Energy Prediction Modeling Based on CPU Utilization", *Proc. the 8th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 2013. (25%, 8 pages)
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 113. J. Zhang*, X.-F. Jiang*, M. I. Alghamdi*, M. M. Al Assaf*, Y. Tian*, **X. Qin**, and M. Qiu, "ORCA: An Offloading Framework for I/O-Intensive Applications on Clusters," *Proc. the 31st IEEE International Performance Computing and Communications Conference (IPCCC)*, Austin, Texas, Nov. 2012. (**Acceptance Rate:** 27.8%, 32/115) (40%, 10 pages)
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 115. X.-J. Ruan*, M. I. Alghamdi*, X.-F. Jiang*, Z.-L. Zong*, Y. Tian*, and **X. Qin**, "Improving Write Performance by Enhancing Internal Parallelism of Solid State Drives," *Proc. the 31st IEEE International Performance Computing and Communications Conference (IPCCC)*, Austin, Texas, Nov. 2012. (**Acceptance Rate:** 27.8%, 32/115) (40%, 10 pages)
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- CCGrid 2003, pp.730-735. *Workshop on Parallel I/O in Cluster Computing and Computational Grids*, Japan, May 2003. (10%, 6 pages)
200. **X. Qin**, H. Jiang, and D. Swanson, "An Efficient Fault-tolerant Scheduling Algorithm for Real-time Tasks with Precedence Constraints in Heterogeneous Systems," *Proceedings of the 31st International Conference on Parallel Processing (ICPP'02)*, pp.360-368. Vancouver, British Columbia, Canada, Aug. 18-21, 2002. IEEE Press. (**Acceptance Rate: 35%; Citation: 11; Impact Factor: 0.95**, top 313, top 25.63%, source: CiteSeer) (80%, 8 pages)
 201. **X. Qin** and H. Jiang, "Dynamic, Reliability-driven Scheduling of Parallel Real-time Jobs in Heterogeneous Systems," *Proceedings of the 30th International Conference on Parallel Processing (ICPP 2001)*, pp.113-122. Valencia, Spain, September 3-7, 2001. IEEE Press. (**Acceptance Rate: 46%; Impact Factor: 0.95**, top 313, top 25.63%, source: CiteSeer) (80%, 10 pages)
 202. **X. Qin** and C. Sun, "Recovery Support for Internet-based Real-Time Collaborative Editing Systems," *Proceedings of the International Conference on Computer Networks and Mobile Computing (ICCNMC)*, October 16-19, 2001. IEEE Press. (80%, 8 pages)
 203. **X. Qin** and C. Sun, "Efficient Recovery Algorithm in Real-Time and Fault-Tolerant Collaborative Editing Systems," *Workshop on Collaborative Editing Systems*, in conjunction with ACM 2000 Conference on Computer Supported Cooperative Work (CSCW'2000), Dec. 3, 2000 Philadelphia, Pennsylvania. (80%, 6 pages)
 204. **X. Qin**, H. Jiang, C. Xie, and Z. Han, "Reliability-driven scheduling for real-time tasks with precedence constraints in heterogeneous distributed systems," *Proceedings of the International Conference Parallel and Distributed Computing and Systems 2000, (PDCS 2000)*, November 6-9, 2000, Las Vegas. (80%, 8 pages)
 205. **X. Qin**, L. Pang, Z. Han, and S. Li, "Real-time Scheduling for Dependable Multimedia Tasks in Multiprocessor Systems," *Proceedings of the IEEE TENCON 2000*, September 2000, Malaysia. (90%, 8 pages)
 206. **X. Qin**, Z. Han, H. Jin, L. Pang, and S. Li. "Real-time Fault-tolerant Scheduling in Heterogeneous Distributed Systems," *Proceedings of the International Workshop on Cluster Computing-Technologies, Environments, and Applications (CC-TEA)*, Vol. I, pp.421-427. Las Vegas, June 26-29, 2000. (90%, 6 pages)
 207. **X. Qin**, L. Pang, S. Li, and Z. Han, "Efficient Scheduling Algorithm with Fault-tolerance for Real-time Tasks in Distributed Systems," *Proc. Int'l Conf. for Young Computer Scientists*, pp.721-725, 1999, China. (90%, 6 pages)
 208. **X. Qin**, L. Pang, and S. Li, "Real-Time Scheduling for Multi-Granularity Locks in Objected-Oriented Database," Poster Session, *the 23rd IFAC/IFIP Workshop on Real Time Programming*, June, 1998, China. (90%, 4 pages)
 209. **X. Qin**, L. Pang, Z. Han, and C. Gui, "Real-Time Disk Scheduling for Mirrored Disk Systems," Poster Session, *the 23rd IFAC/IFIP Workshop on Real Time Programming*, June 1998, China. (90%, 4 pages)

2.3.4 Other Selected Publications

210. J.-F. Zhang, Y.-H. Li*, **X. Qin**, and Y.-L. Xun*, "A Related Subspace-based Local Outlier Detection Algorithm Using MapReduce," *Journal of Software*, Vol.25, In Press 2014, China. (In Chinese)
211. **X. Qin**, Z. Han and L. Pang, "Real-time Scheduling with Fault-tolerance in Heterogeneous Distributed Systems," *Chinese Journal of Computers*, Vol.25, No.1, January 2002, China. (In Chinese)
212. **X. Qin**, L. Pang, Z. Han, and S. Li, "Design and Performance Analysis of a Hybrid Real-time Scheduling Algorithm with Fault-Tolerance," *Journal of Software*, Vol.11, No.5, May 2000, China. (In Chinese)
213. **X. Qin** and L. Pang, "An Automatic Testing System of Scheduling Strategies in Real-Time UNIX,"

* Chinese Journal of Computers and Journal of Software have consistently been ranked among the top journals in computer science and engineering in China.

† Chinese Journal of Computers and Journal of Software have consistently been ranked among the top journals in computer science and engineering in China.

- Journal of Systems Engineering and Electronics*, 1999, China.
214. **X. Qin**, L. Pang, Z. Han, and S. Li, "The Study of Real-time Disk Scheduling for Two-Headed Mirrored Disk with Autonomous Heads," *Journal of Software*, Vol.10, No.9, September 1999, China. (In Chinese)
 215. **X. Qin**, Z. Han, L. Pang, and S. Li, "A Static Scheduling Algorithm for Real-time and Fault-tolerant tasks in Multiprocessor Systems," (Short Paper), *in the Proceedings of the Fifth International Conference for Young Computer Scientists*, 1999, China.
 216. **X. Qin**, L. Pang, Z. Han, and S. Li, "Design and Performance Evaluation of Real-time Disk Scheduling for Two-Headed Mirrored Disk Systems," *Chinese Journal of Computers*, Vol.22, No.2, pp. 212-217, Feb. 1999, China. (In Chinese)
 217. **X. Qin**, L. Pang, and Z. Han, "Disk Scheduling for Two-Headed Mirrored Disk Systems using Parallel Positioning," *Chinese Journal of Computers*, Vol.21, No.12, pp. 1119-1124, 1998, China. (In Chinese)
 218. **X. Qin** and L. Pang, "CRF-A Scheduling for Multi-Granularity Lock in Objected-Oriented Database," *Journal of Systems Engineering and Electronics*, Vol.9, No.4, pp. 51-57, Sept. 1998, China.

2.4 Invited Talks/Conference Talks

(Note: 56 presentations and talks; **47 talks** have been given since Qin joined Auburn University in July 2007)

1. "Big Data Analytics in Textile Industry," Seminar talk at Wuhan Textile University, Wuhan, Hubei, China, Dec 2015.
2. "Data Center Specific Thermal and Energy Saving Techniques," Seminar talk at Wuhan Textile University, Wuhan, Hubei, China, June 2015.
3. "Analysis and Design of Fault-Tolerant Scheduling for Real-Time Tasks on Earth-Observation Satellites," presented at 2014 International Conference on Parallel Processing (ICPP-2014), MN, September 11th, 2014.
4. "Thermal Modeling and Management," Seminar talk at Wuhan Textile University, Wuhan, Hubei, China, July 2nd, 2014.
5. "How to read and write papers," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, June 25, 2014.
6. "Energy-Efficient Storage Clusters," Seminar talk at Auburn University, Fall 2013.
7. "Data-Intensive Computing on Clusters," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, June 2013.
8. "MapReduce: Simplified Data Processing on Large Clusters," Seminar talk at Inner Mongolia Normal University, June 23, 2013.
9. "Energy Efficient Storage Systems," Seminar talk at the University of Alabama, Feb. 6, 2013.
10. "Energy Efficient Data Storage Systems," Keynote talk at *the 3rd International Conference on Mechanic Automation and Control Engineering (MACE 2012)*, Baotou, Inner Mongolia, China, July 2012.
11. "Performance Evaluation of Traditional Caching Policies on a Large System with Petabytes of Data," presented at *the 7th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, June 29, 2012.
12. "An Active and Hybrid Storage System for Data-intensive Applications," Seminar talk at Wuhan Textile University, Wuhan, Hubei, China, June 26, 2012.
13. "Data-Intensive Computing on Hadoop Clusters," Panel presentation at Wuhan National Laboratory for Optoelectronics, Wuhan, Hubei, China, June 8, 2012.
14. "Reliability Analysis for an Energy-Aware RAID System," *Proc. the 30th IEEE International Performance Computing and Communications Conference (IPCCC)*, Nov. 2011.
15. "Secure Fragment Allocation in a Distributed Storage System with Heterogeneous Vulnerabilities," presented at *the 6th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 28, 2011.
16. "Energy-Efficient High-Performance Storage Systems," Lecture at the Summer School on High-Performance Computing, Hunan University, Changsha, Hunan, China, July 21-23, 2011.
17. "Energy-Efficient Prefetching and Parallel File Systems," Seminar talk at Nanjing University,

- Nanjing, Jiangsu, China, June 27, 2011.
18. "High-Performance Storage Systems for Remote Sensing Applications," Keynote talk at the Int'l Conf. Remote Sensing, Environment and Transportation Engineering, Nanjing, Jiangsu, China, June 25, 2011.
 19. "Energy-Efficient High-Performance Clusters," Seminar talk at Hunan University, Changsha, Hunan, China, June 22, 2011.
 20. "Energy-Efficient Parallel Storage Systems with Write-Buffer Disks," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, June 17, 2011.
 21. "Energy-Efficient Parallel Storage Systems with Write-Buffer Disks," Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 10, 2011.
 22. "How to Write Research Papers," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, June 3, 2011.
 23. "Energy-efficient prefetching for high-performance storage systems," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China. June 2, 2011.
 24. "An Application-Oriented Approach for Computer Security Education," invited talk at the Information Security and Computer Applications Conference, Feb. 25, 2011.
 25. "A Novel Application-Oriented Approach to Teaching Computer Security Courses". Poster Session at NSF CCLI/TUES Conference, January 27, 2011.
 26. "Energy Efficient Prefetching – From models to Implementation". Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 2010.
 27. "How to Read Papers?" Training Session for REU students at Auburn University, May 18, 2010.
 28. "How to Succeed in the AU REU Program?" Training Session for REU students at Auburn University, May 17, 2010.
 29. "Improving Energy-Efficiency and Reliability of Storage Systems," Seminar talk at the University of New Orleans, Sept. 4, 2009.
 30. "Can We Improve Energy Efficiency of Secure Disk Systems without Modifying Security Mechanisms?" the IEEE NAS'09 Conference, ZhangJiaJie, China, July 10, 2009.
 31. "Security-Aware Scheduling for Real-Time Parallel Applications on Clusters," Lecture at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 22, 2009.
 32. "How to Read Papers?" Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, June 17, 2009.
 33. "Energy Efficient Scheduling for High-Performance Clusters," Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 8, 2009.
 34. "An Overview of Auburn University," Seminar talk at Nanjing University of Information Science and Technology, Nanjing, China, June 3, 2009.
 35. "Thinking About Going to Graduate School?" Seminar talk at Nanjing University of Information Science and Technology, Nanjing, China, June 3, 2009.
 36. "How to Write Research Papers, Part 1 – General Principles," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, May 27, 2009.
 37. "Energy Efficient Scheduling for High-Performance Clusters," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China. May 26, 2009.
 38. "Energy Efficient Resource Management for High-Performance Computing Platforms," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, May 15, 2009.
 39. "How to Write Research Papers, Part 1 – General Principles," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, May 12, 2009.
 40. "DARAW: A New Write Buffer to Improve Parallel I/O Energy-Efficiency," *the 24th Annual ACM Symposium on Applied Computing*, Hawaii, March 2009.
 41. "Why Major in Computer Science and Software Engineering?", Samuel Ginn College of Engineering, Auburn University, Feb. 2009.
 42. "PARM: A Power-Aware Message Scheduling Algorithm for Real-Time Wireless Networks," Poster Presentation at Oak Ridge National Laboratory, Oct. 2008.
 43. "Distributed Energy-Efficient Scheduling for Data-Intensive Applications with Deadline Constraints on Data Grids," the 27th IEEE International Performance Computing and Communications Conference (IPCCC), Dec. 2008.
 44. "Enhancing Security of Parallel Applications," Columbus State University, Feb. 2008.
 45. "Security-Aware Scheduling for Clusters," University of Southern Mississippi, Oct. 2007.

46. "Security-Aware High Performance Cluster Systems," Tutorial, Int'l Conf. Cluster Computing, Sept., 2007.
47. "Design and Performance Analysis of Energy-Efficient Parallel Storage Systems," *Commodity Cluster Symposium 2007 (CCS)*, Annapolis, Maryland, July 2007.
48. "Security-Aware Scheduling for Real-Time Systems," Wuhan University of Technology, China, May 2006.
49. "Security-Aware Real-Time Scheduling," Huazhong University of Science and Technology, China, June 2006.
50. "Improving Effective Bandwidth of Networks on Clusters using Load Balancing for Communication-Intensive Applications," *the 24th IEEE International Performance, Computing, and Communications Conference (IPCCC 2005)*, Phoenix, Arizona, April 7-9, 2005.
51. "Improving Network Performance through Task Duplication for Parallel Applications on Clusters," *the 24th IEEE International Performance, Computing, and Communications Conference (IPCCC 2005)*, Phoenix, Arizona, April 7-9, 2005.
52. "Dynamic Load Balancing of I/O-Intensive Parallel Applications on Clusters," *Department of Computer Science*, New Mexico Institute of Mining and Technology, Socorro, NM, Feb. 6, 2004.
53. "Dynamic Load Balancing Support for I/O-Intensive Parallel Applications in Cluster Systems," *Holcombe Department of Electrical and Computer Engineering, Clemson University, Clemson, SC*, Nov. 14, 2003.
54. "Real-time Fault-tolerant Scheduling in Heterogeneous Distributed Systems", *Wuhan University of Technology*, China, Jan. 2003.
55. "An Efficient Fault-tolerant Scheduling Algorithm for Real-time Tasks with Precedence Constraints in Heterogeneous Systems," *the 31st International Conference on Parallel Processing (ICPP 2002)*, Vancouver, Canada, Aug. 2002.
56. "Delayed Convergence in Distributed Interactive Systems with Continuous Media", *Griffith University*, Australia, June, 2001.

2.5 Membership

- Institute for Electrical and Electronic Engineers (IEEE), Senior Member (2009-2015)
- Institute for Electrical and Electronic Engineers (IEEE), Member (2004-2009)
- Institute for Electrical and Electronic Engineers (IEEE), Student Member (2000-2004)
- Association for Computing Machinery (ACM), Member (2008-2013)

2.6 Collaborators

- John Bent (Los Alamos National Lab)
- Gary Grider (Los Alamos National Lab)
- Meikang Qiu (University of Kentucky)
- Ziliang Zong (South Dakota School of Mines and Technology)
- Xiaolin Li (University of Florida)
- Feng Zhu (The University of Alabama in Huntsville)
- Mais Nijim (Texas A&M University-Kingsville)
- Peter C. Lichtner (Los Alamos National Lab)
- Ira Pramanick (Sun Microsystems, Inc.)
- Neil D. Pundit (Sandia National Laboratories)
- Tafoya, Ronald (Intel Corporation)
- Thomas Sterling (JPL/Louisiana State U.)
- Tao Xie (San Diego State University)
- Yiming Yang (Intel Corporation)
- William Yurcik (Army Research Laboratory)
- Hong Jiang (U. of Nebraska-Lincoln)

3. Teaching, Mentoring, and Advising Activities

3.1 Teaching Experience

- **Auburn University**

Academic Term	Course	Enrollment
Spring 2016	COMP4710 Senior Design	20
Spring 2016	COMP2710 Software Construction	86
Fall 2015	COMP7330 Advanced Parallel and Distributed Computing	18
Fall 2015	COMP3500 Introduction to Operating Systems	57
Spring 2015	COMP2710 Software Construction	72
Fall 2014	COMP3500 Introduction to Operating Systems	62
Fall 2014	COMP4300 Computer Architecture	79
Spring 2014	COMP4710 Senior Design	24
Spring 2014	COMP2710 Software Construction	68
Fall 2013	COMP7330 Advanced Parallel and Distributed Computing	18
Fall 2013	COMP3000 Object-Oriented Prog. for Engineers and Scientists	15
Spring 2013	COMP7500 Advanced Operating Systems	33
Fall 2012	COMP4300 Computer Architecture	41
Fall 2012	COMP2710 Software Construction	21
Spring 2012	COMP7500 Advanced Operating Systems	9
Spring 2012	COMP2710 Software Construction	53
Fall 2011	COMP2710 Software Construction	53
Spring 2011	COMP7370 Advanced Computer and Network Security	16
Fall 2010	COMP4300 Computer Architecture	37
Spring 2010	COMP2710 Software Construction	61
Spring 2010	COMP7500 Advanced Operating Systems	15
Fall 2009	COMP2710 Software Construction	59
Spring 2009	COMP7370 Advanced Computer and Network Security	6
Fall 2008	COMP4300 Computer Architecture	26
Spring 2008	CSC490 Introduction to Computer Security (Alabama State U)	8
Spring 2008	COMP7370 Advanced Computer and Network Security	15
Fall 2007	COMP7970 Storage Systems	14

- **New Mexico Institute of Mining and Technology**

Academic Term	Course	Enrollment
Spring 2007	CS531 Advanced Computer Architecture	14
Spring 2007	CS325 Principles of Operating Systems	33
Fall 2006	CS589-6 Distributed Systems	9
Fall 2006	CS331 Computer Architecture	25
Spring 2006	CS325 Principles of Operating Systems	36
Spring 2006	CS589-2 Embedded Systems Design	14
Fall 2005	CS589-4 Real-Time Systems	10
Fall 2005	CS391/IT263 Information Protection and Security	21
Spring 2005	CS325 Principles of Operating Systems	31
Fall 2004	CS122 Algorithms and Data Structures	31

- University of Nebraska-Lincoln.

07/2002 – 08/2002, Institute for International Teaching Assistants.

- Successfully completed the workshop for international teaching assistants.

- Griffith University, Australia.

08/2000 – 07/2001, *Computer Science Tutor*, School of Computing and Information Technology.

- Tutored undergraduate students having problems with their computer science class assignments and projects.

- Huazhong University of Science and Technology, China.

09/1998 – 12/1998, *Teaching Assistant*, Department of Computer Science and Engineering.

- Taught introduction to computer science labs.

3.2 Course or Curriculum Development

3.2.1 New Courses

- COMP 7500 Advanced Operating Systems, 3 cr, 3 cl hrs, Auburn University

In this graduate class, we aim at giving students a strong background in understanding design and development of file and I/O systems in general and prefetching algorithms in particular. Topics covered in this new course include predictive prefetching algorithms, parallel data transfer, benchmarking, measurement requirements, workload modeling, disk simulations, tools for high-performance storage system design, and data-intensive computing applications. A mini-conference model was used to motivate and educate graduate students to conduct research projects in the discipline of storage systems, energy-efficient computing, and prefetching/caching for file systems. By the end of the Spring 2010 semester, each graduate student is required to write a research paper and submit to a mini-conference. All the student papers were reviewed and each student gave a presentation of 20 minutes. After each presentation, each student had a question-answer session of 5 minutes. I gave constructive comments and suggestions on each student's research project. In this mini-conference model, the graduate students who are taking the Comp7500 class improved their presentation and communication skills.

- COMP 7970 Storage Systems, 3 cr, 3 cl hrs, Auburn University

In this graduate class, we addressed advanced topics in the arena of storage systems. This course was research intensive, aiming at deriving practical and achievable ground rules for storage systems design. Each student conducted a project including a written report and an in-class presentation on various topics in the realm of data storage systems.

- CS589-6: Distributed Systems, 3 cr, 3 cl hrs

This course was introduced in Fall 2006. In this course, we address the issues of design of distributed systems. In particular, we investigate successful approaches in the form of abstract models, algorithms, and cases studies of real-world systems. The course covers the characterization of distributed systems, data replication, interprocess communications, web services, design of scalable distributed systems, and distributed multimedia systems.

Graduate/undergraduate students in both computer science and electrical engineering took this class. Among the eight course projects, one was published in a competitive conference in Spring 2007 (see Section 2.3.3 [27]), one was published in a workshop in Fall 2006 (see Section 2.3.3 [28]), one was submitted to a competitive conference, and one was developed into a journal paper submitted to IEEE Transactions on Computers (see Section 2.3.5 [1]).

- CS569: Embedded Systems Design, 3 cr, 3 cl hrs

This course was introduced in Spring 2006. It covers the hardware/software codesign, embedded processor architecture and programming, models of computation for embedded systems, architecture selection, performance analysis and optimization, application-level embedded system design concepts, and design methodologies.

Apart from graduate students in computer science, this course has attracted computer science undergraduate students and graduate/undergraduate students from the department of electrical engineering. Out of the twelve course projects, three was published in competitive conferences in Fall 2006 (see Section 2.3.3 [30], [31] and [32]), one was later developed into a journal paper published in ACM Transactions on Embedded Computing Systems (see Section 2.3.2 [10]), and one was published in a journal – Future Generation Computer Systems (see Section 2.3.2 [10]). Two undergraduate students were admitted to graduate programs at the University of Colorado at Boulder and the University of New Mexico.

- CS570: Real-time Systems, 3 cr, 3 cl hrs

This course was introduced in Fall 2005. It builds on students' prior knowledge of operating systems,

addresses various issues of designing and validating real-time systems. The focus of the course is on understanding timing effects in software, and approaches to designing software in a way to predict and control times at which actions are performed. The course emphasizes basic principles of real-time systems and, therefore, students will be gaining skills needed to extend existing methods in real-time systems and develop new techniques. The course is research intensive, aiming at deriving practical and achievable ground rules for real-time systems design. Graduate students are expected to do an extra project including a written report and an in-class presentation on a topic to be arranged with the instructor. Students are expected to collaborate with other students toward the completion of the research project related to real-time systems.

Besides computer science graduate and undergraduate students, this course has attracted graduate students from the department of electrical engineering. Among the ten course projects, two were published in competitive conferences in Spring 2006 (see Section 2.3.3 [36] and [37]), one was published in ACM Transactions on Storage Systems (see Section 2.3.2 [8]), and one was later developed into a journal paper submitted to IEEE Transactions on Wireless Communications (see Section 2.3.2 [4]). Paper [4] was revised In Fall 2006, and it is under a second-round review.

3.2.2 Significant Revisions

- CS325: Principles of Operating Systems, 3 cr, 3 cl hrs

I revised this course aiming at educating students on the fundamental concepts and components of operating systems, introducing the characteristics of hardware related to operating systems, and presenting good tradeoffs among objectives conflicting with one another. Five lab projects were introduced and used in the lab sessions. A course webpage was developed and all the lecture notes were posted on the course webpage.

- CS331: Computer Architecture, 3 cr, 3 cl hrs

I revised this course in a way to focus on many issues and challenges involved in designing and implementing modern computer systems. In this class we studied the architecture and implementation of von Neumann computer systems. Students are expected to understand the interdependence of architectural and implementation decisions, which is of help to the development of performance-critical applications. Four lab projects were introduced. Upon completion of the four lab assignments, students developed two simulated computer systems with pipelines and the scoreboard mechanism. A course webpage was developed and all the lecture notes were posted on the course webpage.

- CS531: Advanced Computer Architecture, 3 cr, 3 cl hrs

This course was last offered in late 1990's. Since then parallel computer architectures have gained more attention. The course with major revisions will be offered in Spring 2006. It covers the fundamentals in the design parallel computer architecture, evaluation of architectures using parallel workloads, shared memory multiprocessing, scalable multiprocessors, and hardware/software trade-offs. This course will be research-intensive in nature. Conference and journal papers/submissions, scholarly papers, and technical reports satisfying the M.S. and Ph.D. degree requirements are expected.

3.2.3 Other

- New Ph.D. qualifying exam: Computer Organization; Auburn University.

I have provided problems and answers for the computer organization track of the qualifying exam that was given twice a year since 2007.

- New Ph.D. qualifying exam: CS331 Computer Architecture; New Mexico Tech.

I have provided problems and answers for the CS331 qualifying exam. For the first time the exam was given in Fall 2006 and Fall 2007.

- New Ph.D. qualifying exam: CS325 Principles of Operating Systems; New Mexico Tech.

I have prepared problems and solutions for the CS325 qualifying exam, which was given for the first time in Spring 2006. I also will prepare a different set of exam problems and solutions that will be given in Spring 2007.

3.3 Advising

I have graduated 18 Ph.D. students, 12 M.S. students (7 with thesis and 5 with projects). 15 doctoral students have graduated from Auburn University since 2007; 3 doctoral students have graduated from New Mexico Tech during the period of 2006-2008. In addition, I have served on the committees for 35 Ph.D. students, 30 M.S. students, and 4 undergraduate students.

3.3.1 Ph.D. Dissertations

- Yuanqi Chen [Ph.D., May 2016; Auburn University]
Starting employment: Member of Technical Staff, Equifax Inc.
Dissertation Research: Thermal Management and Data Archiving in Data Centers.
 We proposed a thermal efficiency benchmark called *ThermoBench* for clusters. *ThermoBench* evaluates the thermal efficiency of computing and storage clusters deployed in data centers. We also built a self-adjusting model called TERN to predict thermal behaviors of hardware resources for client sessions. In the last part of this research, we proposed an erasure-coded data archival system called *aHDFS* for Hadoop clusters, where RS(k+r,k) Codes are employed to archive rarely accessed replicas in the Hadoop distributed file system or HDFS to achieve storage efficiency in data centers.
- Liang Tang [Ph.D., May 2016; Auburn University; Co-Advisor: Dr. Wei-Shinn Ku]
Starting employment: Member of Technical Staff, LinkedIn
Dissertation Research: A MapReduce Framework for Probabilistic Skylines over Uncertain Data.
 We are focusing on how to leverage the MapReduce programming model to process the exact p-skylines on uncertain data in a highly efficient and scalable way.
- Tausif Muzaffar [Ph.D., Summer 2015; Auburn University]
Starting employment: Member of Technical Staff, Salesforce
Dissertation Research: An I/O-Aware Thermal Model for Data Centers.
 With ever-growing cooling costs of large-scale data centers, thermal management of must be adequately addressed. Thermal models play a critical role in thermal management that helps in reducing cooling costs in data centers. However, existing thermal models for data centers overload I/O activities. To address this issue, we develop an I/O-aware thermal model called iTad for data centers. The iTad model captures the thermal characteristics of servers in a data center, offering a much finer granularity than the existing models. In addition to CPU workloads, iTad incorporates the I/O load in order to accurately estimate the thermal footprint of the servers with I/O-intensive activities. We validate the accuracy of the iTad model using real-world temperature measurements acquired by an infrared thermometer.
- Xunfei Jiang [Ph.D., Aug. 2014; Auburn University]
Starting employment: Assistant Professor at Earlham College
Dissertation Research: Thermal Modeling of Data Storage Systems.
 We address in this study the thermal impact of storage systems. In the first phase of this work, we generate the thermal profile of a storage server containing three hard disks. The profiling results show that disks have comparable thermal impacts as processing and networking elements to overall storage node temperature. We develop a thermal model to estimate the outlet temperature of a storage server based on processor and disk utilizations. The thermal model is validated against data acquired by an infrared thermometer as well as build-in temperature sensors on disks. Next, we apply the thermal model to investigate the thermal impact of workload management on storage systems.

- Yun Tian [Ph.D., May 2013; Auburn University]
Starting employment: Assistant Professor at California State University, Fullerton.
Dissertation Research: Security and Performance Improvement in Distributed Systems.
 In this project, we develop a fragment allocation scheme called S-FAS to improve security of a distributed system where storage sites have a wide variety of vulnerabilities. In the S-FAS approach, we integrate file fragmentation with the secret sharing technique in a distributed storage system with heterogeneous properties in vulnerability. Storage sites in a distributed system are classified into a variety of different server types base upon vulnerability characteristics. Given a file and a distributed system, S-FAS allocates fragments of the file to as many different types of nodes as possible in the system.
- Ji Zhang [Ph.D., May 2013; Auburn University; Co-Advisor: Dr. Wei-Shinn Ku]
Starting employment: Member of Technical Staff, VT iDirect, Inc.
Dissertation Research: Context-Based File Systems and Spatial Query Applications.
 This dissertation presents studies related to I/O techniques in data-intensive computation and advanced solutions of spatial queries. There is a lack of general mechanisms for integrating multiple file system techniques and, therefore, the dissertation first illustrates a framework for Context-Based File Systems (CBFSs), which simplifies the development of context-based file systems and applications. Unlike existing informed-based context-aware systems, the framework provides a unifying informed-based mechanism that abstracts context-specific solutions as views, thereby allowing applications to make view selections according to their behaviors. In the second part of this dissertation, we propose two novel spatial queries, multi-criteria optimal location query and keyword-spatial query.
- Shu Yin [Ph.D., May 2012; Auburn University]
Starting employment: Assistant Professor at Hunan University, Hunan, China
Dissertation Research: Reliability Models for Energy-Efficient Disk Systems.
 This project contributes to reliability modeling techniques for fault-tolerant and energy-efficient parallel disk systems by developing a reliability analysis modeling toolkit accompanied with a set of novel mathematical reliability models. The innovative models investigated in this project include disk power consumption models, a reliability model for parallel disk systems with redundancy techniques, a reliability model for repairable and energy-efficient parallel disk systems, a fault recovery model for energy-efficient parallel disk systems.
- Yixian Yang [Ph.D., May 2012; Auburn University]
Current employment: Member of Technical Staff, Oracle Corporation
Starting employment: Member of Technical Staff, VMWare Inc.
Dissertation Research: Improve I/O Performance of Hadoop Clusters.
 This project will contribute to reliability modeling techniques for fault-tolerant and energy-efficient parallel disk systems by developing a reliability analysis modeling toolkit accompanied with a set of novel mathematical reliability models. The innovative models investigated in this project include disk power consumption models, a reliability model for parallel disk systems with redundancy techniques, a reliability model for repairable and energy-efficient parallel disk systems, a fault recovery model for energy-efficient parallel disk systems.
- Jiong Xie [Ph.D., Dec. 2011; Auburn University]
Current employment: Senior Engineer, Inner Mongolia Power (Group) Co.,Ltd., China.
Starting employment: Assistant Professor at Hunan University, Hunan, China.
Dissertation Research: Improving Performance of Hadoop Clusters.
 This project addresses the problem of how to place data across nodes in a way that each node has a balanced data processing load. Apart from the data placement issue, we also design a prefetching and predictive scheduling mechanism to help Hadoop in loading data from local or remote disks into main memory.
- Maen M. Al Assaf [Ph.D., Dec. 2011; Auburn University]

Starting employment: Assistant Professor at University of Jordan, Amman, Jordan.

Dissertation Research: Informed Prefetching in Distributed Multi-Levels Storage Systems.

We study pipelined prefetching mechanisms that use application disclosed access patterns to prefetch hinted blocks in multi-level storage systems. The fundamental concept in our approach is to split an informed prefetching process into a set of independent prefetching steps among multiple storage levels (e.g., main memory, solid state disks, and hard disk drives).

- Xiaojun Ruan [Ph.D., Summer 2011; Auburn University]
Starting employment: Assistant Professor at West Chester University of Pennsylvania.
Dissertation: Improving Energy Efficiency and Security in Cluster Computing Systems.
It is a major challenge to conserve energy for parallel disks and energy efficiently coordinate I/Os of hundreds or thousands of concurrent disk devices to meet high-performance and energy-saving requirements. The goal of this research is to develop energy conservation techniques that will provide significant energy savings while achieving low-cost and high-performance for parallel disks.
- Zhiyang Ding [Ph.D., Summer 2011; Auburn University]
Starting employment: Member of Technical Staff, China Investment Corporation.
Dissertation: An Active and Hybrid Storage System for Data-Intensive Applications.
In our multicore-based disk architectures, data processing code can be performed by embedded multicore processors where associated data reside. We will achieve this overall objective by carrying out the following two basic research tasks: (1) designing hardware and software architectures for multicore-based parallel disk systems and (2) developing multicore-based data processing techniques.
- Adam Manzanares [Ph.D. Student, Spring 2010; Auburn University]
Current employment: Research Scientist/Architect, Hitachi Global Storage Technologies.
Previous employment: Assistant Professor at California State University, Chico.
Starting employment: Postdoctoral Fellow, Los Alamos National Laboratory.
Dissertation: Energy Efficient Prefetching – From Models to Implementation
The goal of this research is to bring down the cost of operating parallel disk systems. A computer hard drive can be in several states, including active, idle, or standby, and these states consume various amounts of energy. The project attempts to prefetch popular data into a small subset of the parallel disks (buffer disks) and allow the other disks in the disk system (data disks) to be placed in the standby state. When the data is moved it may cause the buffer disks to become a bottleneck, so the buffer disks must be carefully managed to prevent unacceptable degradations to response times.
- Kiranmai Bellam [Ph.D.; Summer 2009; Auburn University]
Starting employment: Assistant Professor at Prairie View A&M University.
Dissertation: Power, Fault Tolerance, and Security Issues in Real-Time Systems
Power, fault tolerance, and security issues in modern real-time systems are of critical importance. This work is intended to seamlessly integrate security services and energy conservation techniques for real-time systems while endeavoring to achieving high system reliability.
- Ziliang Zong [Ph.D.; Summer 2008; Auburn University]
Current employment: Assistant Professor at Texas State University.
Starting employment: Asst. Prof. of Comp. Sci., South Dakota School of Mines and Tech.
Dissertation: Energy-Efficient Resource Management for High-Performance Computing Platforms
Minimizing power dissipation is an important requirement in developing resource management systems for clusters. In this work, we investigate resource allocation solutions that conserve energy in clusters while retaining high performance. Our resource allocation approaches will judiciously allocate resources of a cluster computing system to satisfy performance needs of parallel applications and achieve significant energy savings.

- Mohammed Alghamdi [Ph.D.; Summer 2008; New Mexico Tech]
Starting employment: Assistant Prof. of Comp. Sci., King Saud University, Saudi Arabia.
Dissertation: Energy-Efficient Packet Transmissions in Real-Time Wireless Networks.
 Reducing energy consumption has become a major goal in designing modern real-time wireless networks. The focus of this study is to investigate the power and real-time issues in wireless networks. The study aims to develop a rich variety of scheduling schemes to reduce energy dissipation while meeting timing constraints of real-time applications in wireless networks.
- Mais Nijim [Ph.D.; Summer 2007; New Mexico Tech]
Current employment: Assistant Professor at Texas A&M University-Kingsville.
Starting employment: Assistant Prof. of Computer Sci., University of Southern Mississippi.
Dissertation: Adaptive Quality of Security Control in Storage Systems.
 The purpose of this study is to address a novel approach to achieving high performance and high quality of security at the same time. We proposed an array of adaptive quality of security control schemes that makes it possible for storage systems to adapt to changing security requirements and workload conditions.
- Tao Xie [Ph.D.; May 2006; New Mexico Tech]
Current employment: Associate Prof. of Computer Science, San Diego State University
Starting employment: Assistant Prof. of Computer Science, San Diego State University.
Dissertation: Security-Aware Scheduling for Real-Time Systems.
 An increasing number of real-time systems like aircraft control and medical electronics systems require high quality of security to assure confidentiality, authenticity and integrity of information. This work investigates scheduling approaches to improving security of real-time systems.

3.3.2 Current Doctoral Students in Progress at Auburn University

- Yi Zhou [Ph.D. Student, Fall 2018 Expected; Auburn University]
Dissertation Research: Energy-Efficient Database Operations on Multicore Servers.
 Evaluating energy efficiency of database applications running on multicore systems becomes an indispensable and strategic component of building green data centers. We discuss the criteria and challenges of building an energy efficiency benchmark for databases. We construct a benchmark to evaluate the energy consumption of operations on multicore processors.
- Shubhi Taneja [Ph.D. Student, Fall 2018 Expected; Auburn University]
Dissertation Research: Thermal-Efficient Hadoop Clusters.
 We develop a thermal model to investigate thermal profiles of Hadoop clusters processing a massive amount of data.
- Yangyang Liu [Ph.D. Student, Fall 2017 Expected; Auburn University]
Dissertation Research: Energy-Efficient Benchmarking of Database Systems.
 We develop an energy-efficiency benchmark tool for database systems. Our tool will be applied to develop green resource management techniques for large-scale database systems.
- Ajit Chavan [Ph.D. Student, Spring 2015 Expected; Auburn University]
Dissertation Research: Thermal-Aware File Assignment in Cluster Storage Systems.
 In this research, we present a thermal-aware file assignment technique called TIGER for reducing cooling cost of storage clusters in data centers. The TIGER scheme aims to lower peak inlet temperatures of storage clusters by dynamic thermal management through file placements. TIGER makes use of cross-interference coefficients to estimate the recirculation of hot air from the outlets to the inlets of data nodes. We evaluate performance of TIGER in terms of both cooling energy conservation and response time of a storage cluster. Our results confirm that TIGER reduces cooling-power requirements for clusters by

offering about 10 to 15 percent cooling-energy savings without significantly degrading I/O performance.

3.3.3 Current M.S. Students in Progress at Auburn University

- Xiao Li [Dec. 2016 Expected; Auburn University]
- Xiaopu Peng [Dec. 2017 Expected; Auburn University]
- Chaowei Zhang [Dec. 2017 Expected; Auburn University]

3.3.4 M.S. Theses and Projects

- Chetan Prakash Somani [Dec. 2015; Auburn University]
Thesis: Item-based Recommendation Algorithms using Hadoop
We start this research by implementing a recommendation algorithm using a sequential approach for a large dataset. We then develop a parallel algorithm to derive recommendations by using the Hadoop framework along with an item-based similarity collaborative filtering technique.
- Anirudh Sivapurapu [Dec. 2015; Auburn University]
Project: Detecting Trends from Twitter Social Data
We propose two schemes for trending topics on real time twitter data. The first scheme is done by using a Chi-Square metric, which is a statistical approach commonly used to compare observed data with the data we would expect to obtain according to a specific hypothesis. The second approach is by using Min Hashing, which is a technique for quickly estimating how similar the two sets are.
- Hasitha Athota [Dec. 2015; Auburn University]
Project: Content Based Recommendation System on Hadoop Clusters
Recommendations made by our system are driven by analyzing the contents of users. We focus on content-based filtering methods.
- Sudha Varanasi [Graduated in May 2015; Auburn University]
Starting employment: Software Engineer, Infogroup
Thesis: A User-based Collaborative Filtering Recommender Algorithm on Hadoop Clusters
In this study, we focus on neighborhood-based collaborative filtering methods, which are well known techniques used in recommender systems on Hadoop clusters. Neighborhood-based collaborative filtering methods are user-based and item based, meaning user preferences are inferred solely from what items they and other users in the dataset have interacted with. Experiments prove that user similarity based recommender systems on Hadoop has higher performance with the increase in number of data nodes when compared to the results of implementation in a single node.
- Sanket Reddy Chintapalli [Graduated in Dec. 2014; Auburn University]
Starting employment: Software Engineer, Yahoo
Thesis: Thermal Management in Hadoop Distributed File Systems
We design and implement thermal management policies in Hadoop Distributed file systems or HDFS. Coupled with our new thermal management policies, HDFS becomes more thermal friendly in large-scale data centers.
- Gautam Dudeja [May 2014; Auburn University]
Starting employment: Software Engineer, Texas Instrument
Thesis: Thermal-Aware Scheduling in Hadoop Clusters

In this project, we develop thermal-aware scheduling mechanisms in Hadoop clusters. Our design aims to reduce outlet temperatures of data nodes in a cluster.

- Tausif Muzaffar [May 2014; Auburn University]
Starting employment: Doctoral Student at Auburn University
Thesis: iTad: An I/O-Aware Thermal Model for Data Centers
Thermal models can play a critical role in thermal management that helps in reducing cooling costs in data centers. However, existing thermal models for data centers can overload I/O activities. To address this issue, we develop an I/O-aware thermal model called iTad for data centers. The iTad model captures the thermal characteristics of servers in a data center, offering a much finer granularity than the existing models. In addition to CPU workloads, iTad incorporates the I/O load in order to accurately estimate the thermal footprint of the servers with I/O-intensive activities. We show that thermal management mechanisms can quickly retrieve the thermal information of servers from iTad before making important workload placement decisions in a real-time manner.
- Sanjay Kulkarni [May 2013; Auburn University]
Starting employment: Member of Technical Staff, Symantec Corporation
Thesis: Cooling Hadoop: Temperature Aware Schedulers in Data Centers
Based on thorough investigations of Hadoop's existing schedulers, we propose a couple of new thermal aware schedulers that schedules tasks to balance the outlet temperature across all nodes and reduce AC costs in data center. The experimental results show that our schedulers achieve average outlet temperature saving by 2°C over the default FIFO scheduler that saves about 15% of cooling cost with little performance overhead.
- James Majors [May 2011; Auburn University]
Starting employment: Member of Technical Staff, Greenway Medical Technologies, Inc.
Thesis: Secdoop: A Confidentiality Service on Hadoop Clusters
We implemented two Hadoop applications that distribute the cryptographic process over a trusted cluster. The first application handles encryption of an input file placed inside HDFS (a.k.a., the Hadoop Distributed File System). The second application handles decryption of an input file that is located on HDFS. These two applications demonstrate the effect of utilizing cryptography while distributing processing over a Hadoop cluster.
- Jianguo Lu [M.S. Student, May 2011; Auburn University]
Now: Doctoral Student at Auburn University
Project: MPI-Velvet: A Next Generation Sequence Assembler
We developed MPI-Velvet – a parallel assembler software tool – using MPICH-2 (a message passing interface implementation). MPI_Velvet can process high coverage data sets and quickly reconstruct the underlying sequences. This project contributes to the bioinformatics research community with a new parallel computing tool.
- Gourav Tilve [May 2007, New Mexico Tech]
Research Project: Energy-Efficient Storage Systems
Improving the energy efficiency of storage systems is an intrinsic requirement of next generation large-scale computing systems, because a storage subsystem can represent 27% of the energy consumed in a data center. The goal of this research is to investigate energy conservation techniques that will provide significant energy savings while achieving high-performance for storage systems.
- Kiranmai Bellam [Dec. 2006]
Starting employment: Doctoral Student at Auburn University.
Now: Assistant Professor at Prairie View A&M University.
Research Project: Fault tolerance and security management in real-time systems
The purpose of this study is to address a novel approach to achieving strong fault tolerance and high quality of security at the same time. We will seamlessly integrate a variety of fault

tolerant techniques with an array of security mechanisms in the context of real-time systems.

- Adam Roth [Dec. 2005]

Starting employment: Member of Technical Staff, BigTribe Corporation

Thesis: Power Aware Disk Scheduling Algorithms for Real-Time Systems

This work addresses the crucial issue of energy conservation in real-time storage systems. The thesis presents two energy-aware power management policies, namely, I/O Burstiness for Energy Conservation (IBEC) and Speed-Aware Real-time Disk Scheduling for energy conservation (SARDS), which integrate power management policies into disk scheduling algorithms for I/O-intensive applications.

3.3.5 Undergraduate Students (16 from Auburn University; 3 from New Mexico Tech)

- Justin Lovell [B.S. 2015, REU Student; Auburn University]
Research Topic: Parallel Recommendation Systems
- James Sentell [B.S. 2015, REU Student; Auburn University]
Research Topic: Parallel Recommendation Systems
- Chris Muschek [B.S. 2014, REU Student; Auburn University]
Research Topic: iOS Application Development
- Collin McAtee [B.S. 2014, REU Student; Auburn University]
Research Topic: Parallel Computing for Light-Field Photography
- Garrett Walden [B.S. 2013, REU Student; Auburn University]
- Joshua Lewis [B.S. 2012, REU Student; Auburn University]
Research Topic: Predictive Prefetching in Multiple-Layer Storage Systems.
We implement predictive prefetching algorithms for multiple-layer storage systems. A prefetching mechanism is implemented in a data storage system containing solid-state disks, hard drives, and disk arrays.
- Alfred Nilson [B.S. 2012, REU Student; Auburn University]
Research Topic: A Development Framework for Security-Sensitive Applications
- Greg Poirier [B.S. 2012, REU Student; Auburn University]
Research Topic: A Parallel Encryption System
- Alexander Luchs [B.S. 2012, REU Student; Auburn University]
Research Topic: A Parallel Encryption System
- Riley Spahn [B.S. 2012, REU Student; Auburn University]
Research Topic: A Parallel Encryption System
- Kathryn Catlett [B.S. 2012, REU Student; Auburn University]
Research Topic: A Parallel Encryption System
- Andrew Pitchford [B.S. 2011, REU Student; Auburn University]
Research Topic: Secure Banking Systems
- John Barton [B.S. 2011, REU Student; Auburn University]
Research Topic: A Development Framework for Security-Sensitive Applications.
- Eric Ingram [B.S., 2010, REU Student; Auburn University]
Research Topic: Measuring Energy Efficiency of Parallel Disks
- James Majors [B.S., 2009, REU Student; Auburn University]
Research Topic: Middleware-Based Approach to Teaching Computer Security Courses.
In this project we implement a middleware framework for courses on computer security. The software framework allows teachers to help students learn the rapid development of critical

security software and is the first educational material of its kind designed to teach real-world computing system security to undergraduate students.

- Christopher M. Monsanto [B.S., 2009, REU Student]
Research Topic: Dynamic Power Management for Parallel Disk Systems.
In this research project we design and implement a dynamic power management mechanism to conserve energy in parallel disk systems. The prototype of this mechanism will be integrated into an energy-efficient parallel disk system with buffer disks.
- Matthew E. Briggs [Spring 2006 – Spring 2007]
Research Topic: Energy-efficient disk buffer disks
The goal of this research is to develop a novel buffer-disk architecture that will provide significant energy savings while achieving low-cost and high-performance for parallel disks. In this project we will take an organized approach to implementing energy-saving techniques for parallel disks and simulating energy-efficient parallel disk systems.
- Brian Stinar [B.S., Dec. 2006] (Now: Graduate student, University of New Mexico)
Research Topic: Energy consumption models for high-performance clusters
This study addresses the issue of modeling energy dissipation in computational nodes and network interconnections in high-performance clusters. Brian's work on energy consumption models for clusters appeared in *the proceedings of the 8th IEEE International Conference on Cluster Computing (Cluster'06)*, Sept. 2006. Brian is a winner of the IEEE TCSC's prestigious Student Travel Award.
- Adam Manzanares [B.S. with Honors, May 13, 2006] (Now: Doctoral student, Auburn University)
Research Topic: Random and regular benchmark task graphs for parallel programs
In this study we simulated an array of real world parallel applications running on energy-efficient clusters. Adam's work on energy conservation for high-performance clusters appeared in *the proceedings of the 8th IEEE International Conference on Cluster Computing (Cluster'06)*, Sept. 2006.

3.3.6 Other students who have recently worked with me

- Anand Paturi [01/2007-07/2007] (Ph.D. Student, New Mexico Tech)
Dissertation: QoS-Aware Energy-Efficient Wireless Sensor Networks.
Wireless sensor networks are likely to support a wide spectrum of next-generation applications such as wildlife monitoring and earthquake monitoring applications. In this project, we will study quality-of-service (QoS) and energy conservation issues in modern wireless sensor networks. We aim to develop an approach to minimizing energy dissipation in wireless sensor networks subject to QoS constraints.
- Wei Luo [06/2005 – 07/2008] (Ph.D. Candidate, Huazhong University of Science and Technology)
Research Topic: Fault-tolerant scheduling for heterogeneous systems.
In this project we first proposed novel reliability models tailored for preemptive periodic tasks. Next, we developed an array of real-time fault-tolerant scheduling algorithms for heterogeneous systems.
- Nicholas W. O'Connor [01/2006 – 07/2007] (M.S. Student)
Research Topic: Energy consumption models for disk systems.
This study addresses the issue of modeling energy consumption in server and embedded disk systems.
- Menglei Tang [08/2006 - 12/2006] (Ph.D. Student)
Research Topic: Parallel database systems on clusters.
- Xinfu Hu [08/2005- 12/2005, Ph.D. student] (Ph.D. Student transferred to New Jersey Institute of Technology)
Research Topic: Communication-aware utility-based resource allocation in distributed real-

time systems.

This study is focused on the development of a novel utility model that is aware of commutation cost and benefits. We designed a resource allocation algorithm that aims at maximizing both communication and computation utility of a distributed real-time system.

3.4 Thesis Committee Services

3.4.1 Ph.D. (proposal and/or dissertation defense of 36 doctoral students)

Auburn University (31 Doctoral Students)

1. Uma Kannan [Advisor: Dr. D. Umphress, 2017]
2. Shehenaz Shaik [Advisor: Dr. S. Baskiyar, 2016]
3. Kanika Grover [Advisor: Dr. A. Lim, 2015]
4. Song Gao [Advisor: Dr. A. Lim, 2015]
5. Morris King, James [Advisor: Dr. L. Yilmaz, 2015]
6. Daoqi Hou [Advisor: Dr. C.-H Wu, Dec. 2015]
7. Zhen Li [Advisor: Dr. G.-F. Niu, Dec. 2015]
8. Alexander Applegate [Advisor: Dr. J. D. Hamilton, Spring 2015]
9. Patric Paper [Advisor: Dr. J. D. Hamilton, Spring 2015]
10. Zhuo Liu [Advisor: Dr. W.-K. Yu, Spring 2015]
11. Baohu Li [Advisor: Dr. V. D. Agrawal, Spring 2015]
12. Bei Zhang [Advisor: Dr. V. D. Agrawal, Fall 2014]
13. Jia Yao [Advisor: Dr. V. D. Agrawal, Spring 2014]
14. Dongjin Kim [Advisor: Dr. A. Lim, Spring 2014]
15. Seungbae Lee [Advisor: Dr. A. Lim, Spring 2014]
16. Chih Jye Wang [Advisor: Dr. W.-S. Ku, Spring 2014]
17. Ziyang Xu [Advisor: Dr. G.-F. Niu, Spring 2013]
18. Jian Fang [Advisor: Dr. A. Lim, Spring 2013]
19. David Last [Advisor: Dr. C.-H. Wu, Summer 2013]
20. Feng Zhao [Advisor: Dr. F. Dai, Dec. 2012]
21. Justus Nyagwencha [Advisor: Dr. C. Seals, Dec. 2012]
22. Yuan Tian [Advisor: Dr. W.-K. Yu, Summer 2012]
23. Jianguo Lu [Advisor: Dr. Z. Liu, Summer 2012]
24. Tong Liu [Advisor: Dr. Agrawal, Dec. 2011]
25. Yuehai Jin [Advisor: Dr. F. Dai, Dec. 2011]
26. Jianjun Yu [Advisor: Dr. F. Dai, Dec. 2011]
27. Heiquan Chen [Advisor: Dr. W.-S. Ku, Summer 2011]
28. Qing Yang [Advisor: Dr. A. Lim, Spring 2011]
29. In Keun Son [Advisor: Dr. S.-W. Mao, October 2010]
30. Kehao Zhang [Advisor: Dr. A. Lim, August 2010]
31. Fangyang Shen [Advisor: Dr. M.-T. Sun, July 2008]

New Mexico Institute of Mining and Technology (5 Doctoral Students)

1. William Claycomb [Advisor: Dr. Shin, Fall 2008]
2. Lonny Montoya [Advisor: Dr. Mazumdar, Spring 2008]
3. Majed Abusafiya [Advisor: Dr. Mazumdar, Spring 2007]
4. Mingzhen Wei [Advisor: Dr. Sung, May 2006]
5. Jianyun Xu [Advisor: Dr. Sung, Dec. 2005]

3.4.2 M.S. (30 students)

Auburn University (17 M.S. Students)

1. Pavan Ravi Teja Uppu [Advisor: Dr. S. Baskiyar, Dec 2015]
2. Yusheng Ding [Advisor: Dr. W.-S. Ku, Dec 2015]
3. Sameul Haque [Advisor: Dr. S. Baskiyar, Dec 2015]
4. Kang Sun [Advisor: Dr. S. Biaz, May 2014]
5. Drew Pitchford [Advisor: Dr. C. Seals, May 2014]
6. Adarsh Jain [Advisor: Dr. S. Baskiyar, May 2013]

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| 7. Patrick Pape | [Advisor: Dr. J. D. Hamilton, May 2013] |
| 8. James Mccracken | [Advisor: Dr. A. Lim, Summer 2012] |
| 9. Steven "Andy" Hanna | [Advisor: Dr. J. D. Hamilton, Dec. 2011] |
| 10. Sriharsha Banavara | [Advisor: Dr. J. D. Hamilton, Dec. 2010] |
| 11. Kazuya Sakai | [Advisor: Dr. W.-S. Ku, May 2010] |
| 12. ArunKumar Jayakeerthy | [Advisor: Dr. A. Lim, Nov 2008] |
| 13. Kyoung Min Kim | [Advisor: Dr. M.-T. Sun, July 2008] |
| 14. Shuang Li | [Advisor: Dr. A. Lim, July 2008] |
| 15. Cong Liu | [Advisor: Dr. S. Baskiyar, June 2008] |
| 16. Jonathan Macdonald | [Advisor: Dr. J. D. Hamilton, May 2008] |
| 17. Derek T. Sanders | [Advisor: Dr. J. D. Hamilton, April 2008] |

New Mexico Institute of Mining and Technology (13 M.S. Students)

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|-------------------------|---------------------------------------|
| 1. Jason Mattax | [Advisor: Dr. L. Liebrock, Fall 2007] |
| 2. Ashwin Tamilarasan | [Advisor: Dr. A. Sung, May 2007] |
| 3. Ramya Moturi | [Advisor: Dr. A. Sung, May 2007] |
| 4. Madhu K. ShankarPani | [Advisor: Dr. A. Sung, May 2007] |
| 5. Divya Suryakumar | [Advisor: Dr. A. Sung, May 2007] |
| 6. Rajani Goteti | [Advisor: Dr. A. Sung, Dec. 2006] |
| 7. Rejeev Veeraghattam | [Advisor: Dr. A. Sung, May 2006] |
| 8. Senthil Rajan | [Advisor: Dr. A. Sung, May 2006] |
| 9. William Claycomb | [Advisor: Dr. A. Shin, Dec. 2005] |
| 10. Jianyun Xu | [Advisor: Dr. A. Sung, Dec. 2005] |
| 11. Wei Xu | [Advisor: Dr. A. Sung, Dec. 2005] |
| 12. Wieland Feierabend | [Advisor: Dr. S. Mazumdar, Dec. 2005] |
| 13. Carlisle House | [Advisor: Dr. L. Liebrock, July 2005] |

4. Services

4.1 University and Departmental Services

Auburn University

- Aug. 2015 – Present: Academic Computing Committee
- Aug. 2011 – July 2014: Student Discipline Committee
- Feb. 2011: Judge for Poster Sessions at the Graduate Scholars Forum.

Auburn University –Samuel Ginn College of Engineering

- Oct.–Dec. 2010: Focus Group for Electronic Effort Certification System
- 2010 – Present: Engineering Graduate Fellowship Committee

Auburn University – Department of Computer Science and Software Engineering

- 2011-Present: Chair of the E-Day Committee
- 2008-Present: CSSE School/Award Committee
- 2008-2009: Faculty Recruitment Committee
- 2007-2011: Graduate Committee
- 2007-Present: E-Day Committee

New Mexico Tech

- 2004-2005: Assessment and Evaluation Committee
- 2004-2006: Computing on Campus Committee

4.2 Professional

4.2.1 Technical Program Chair/Co-Chair

- Program Chair, the 31st IEEE International Performance Computing and Communications Conference (IPCCC), Dec. 2012.
- Program Chair, the IEEE International Conference on Networking, Architecture, and Storage

(NAS), June 2012.

- Co-Chair, Storage Systems Track, the IEEE International Conference on Networking, Architecture, and Storage (NAS), July 2010.
- The First IFIP Int'l Workshop on Trusted and Autonomic Ubiquitous and Embedded Systems, Dec. 2005.

4.2.2 Conference Session Chair

- Session Chair, the IEEE International Conference on Networking, Architecture, and Storage (NAS), June 2013.
- Session Chair, the IEEE International Conference on Networking, Architecture, and Storage (NAS), June 2012.
- Session Chair: the 30th IEEE Int'l Performance, Computing, and Communications Conf. (IPCCC'05), Nov. 2011.
- Session Chair: the IEEE International Conference on Networking, Architecture, and Storage (NAS), July 2009.
- Session Chair: the 24th IEEE Int'l Performance, Computing, and Communications Conf. (IPCCC'05), April 2005.
- Session Chair: the 4th Int'l Workshop Performance Modeling, Evaluation, and Optimization of Parallel and Distributed Systems, in conjunction with IPDPS 2005.

4.2.3 Technical Program Committees

- The 7th International Green and Sustainable Computing Conference (IGSC'16), Hangzhou, China on November 7-9, 2016.
- The 21st IEEE International Conference on Parallel and Distributed Systems (ICPADS'16), Wuhan, China, Dec. 2016.
- The 11h IEEE International Conf. Networking, Architecture, and Storage (NAS'16), Long Beach, USA, August 2016.
- The 5th IEEE Non-Volatile Memory System and Applications Symposium (NVMSA'16), Daegu, Korea, August 2016.
- The 44th International Conference on Parallel Processing (ICPP-2015), Beijing, China, Sept. 1-4, 2015.
- The 10th IEEE International Conf. Networking, Architecture, and Storage (NAS'15), Boston, USA, August 2015.
- The 4th IEEE Non-Volatile Memory System and Applications Symposium (NVMSA-2015), Hong Kong, China, August 19-21, 2015.
- The International Workshop of Software-Defined Data Communications and Storage (SDDCS), April 2015, in conjunction with IEEE INFOCOM 2015.
- The 3rd International Workshop on Collaborative Cloud, Miami, Florida, USA, October 22, 2014.
- The 23rd International Heterogeneity in Computing Workshop (HCW'14), Phoenix, Arizona USA, May 19, 2014.
- The 9th IEEE International Conf. Networking, Architecture, and Storage (NAS'14), July 2014.
- The 14th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid'14), May 26-29, 2014, Chicago, IL, USA.
- The 29th Annual ACM Symposium on Applied Computing (SAC'14), Gyeongju, Korea, March 24-28, 2014.
- The 13th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid'13), May 13-16, 2013, Delft, the Netherlands.
- The 28th Annual ACM Symposium on Applied Computing (SAC'13), March 18-22, 2013.
- The 22th International Heterogeneity in Computing Workshop (HCW'13), April 2013.
- The 22nd IEEE Int'l Conf. Computer Communication Networks, (ICCCN'13), Aug. 2013.
- The 21th International Heterogeneity in Computing Workshop (HCW'12), April 2012.
- The 5th International Conference on Contemporary Computing, New Delhi, India, Aug. 6 - 8, 2012.
- The 27th Annual ACM Symposium on Applied Computing (SAC'12), March 26-30, 2012.
- The 9th IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC-11),

Melbourne, Australia, Oct. 2011.

- The 2011 IEEE International Conference on Computational Science and Engineering (CSE'11), Aug. 2011.
- The 20th IEEE Int'l Conf. Computer Communication Networks, (ICCCN'11), Aug. 2011.
- The International Conf. Networking, Architecture, and Storage (NAS'11), July 2011.
- The 27th IEEE Conference on Mass Storage Systems and Technologies (MSST'11), May 2011.
- The 9th IEEE Int'l Symp. Parallel and Distributed Processing with Apps. (ISPA 2011), May 2011.
- The 20th International Heterogeneity in Computing Workshop (HCW'11), April 2011.
- The 26th Annual ACM Symposium on Applied Computing (SAC 2011), March 21-25, 2011.
- The 15th IEEE Symposium on Computers and Communications (ICCS'10), June 2010.
- The 19th International Heterogeneity in Computing Workshop (HCW'10), April 2010.
- International Symposium on Middleware and Networking Applications (MNA 2010), 2010.
- The 38th International Conference on Parallel Processing (ICPP'09), Sept. 2009.
- The 14th IEEE Symposium on Computers and Communications (ICCS'09), July, 2009.
- The 37th International Conference on Parallel Processing (ICPP'08), Sept. 2008.
- The 10th IEEE Int'l Conf. High Performance Comp. and Comm. (HPCC-08), Sept. 2008.
- The 17th Int'l Conf. Computer Communications and Networks (ICCCN'08), Aug. 2008.
- The 13th IEEE Symposium on Computers and Communications (ICCS'08), July 2008.
- International Conf. Networking, Architecture, and Storage (NAS'2008), June 2008.
- The 22nd IEEE Int'l Conf. Advanced Info. Networking and Applications (AINA'08), March 2008.
- The 36th International Conference on Parallel Processing (ICPP'07), Sept. 2007.
- The 4th International Conference on Autonomic and Trusted Computing (ATC'07), July 2007
- The 2007 IEEE Int'l Symp. UbiSafe Computing (UbiSafe'07), Ontario, Canada, May 2007.
- The 4th IEEE Int'l Symp. Embedded Computing (SEC'07), Niagara Falls, Canada, May 2007
- The 21st IEEE Int'l Conf. Advanced Info. Networking and Applications (AINA'07), May 2007
- The 26th IEEE Int'l Perf., Compt., and Comm. Conf. (IPCCC'07), New Orleans, LA, April 2007.
- The 35th Int'l Conf. Parallel Processing (ICPP'06), Columbus, Ohio, Aug. 2006.
- The 8th IEEE International Conference on Cluster Computing (Cluster'06), Sept. 2006.
- The 25th IEEE Int'l Perf., Compt., and Comm. Conf. (IPCCC'06), Phoenix, Arizona, April 2006.
- The 2nd IEEE Int'l Symp. Dependable Autonomic and Secure Computing (DASC'06), Sept. 2006.
- Computer and Network Security Symp. IWCMC 2006.
- The IEEE Int'l Workshop on Trusted and Autonomic Computing Systems, 2006.
- The 38th IEEE Southeastern Symp. System Theory (SSST'06), March 2006.
- The IEEE Int'l Workshop Trusted and Autonomic Computing Systems, April 2006.
- The second Int'l Workshop Security in Networks and Distributed Systems, April 2006.
- The first Int'l Workshop Security in Ubiquitous Computing, Dec. 2005.
- The Int'l Conf. Parallel and Distributed Computing and Systems, Nov. 2005.
- The 2005 Int'l Conf. High Performance Computing and Comm., Sept. 2005.
- The IEEE Int'l Workshop Reliability and Autonomic Management in Parallel and Distr. Sys., 2005.
- The 6th Int'l Workshop Parallel and Distr. Scientific and Engr. Compt., 2005.
- The Int'l Workshop Parallel and Distributed Embedded Sys., 2005.
- The Int'l Workshop Storage Network Architecture and Parallel I/Os, 2004.

4.2.4 Editorships

- Guest Editor for a special issue on Reliability and Autonomic Management, the Journal of Computer Science, 2005.
- Editor: Collaborative Computing, IEEE Distributed Systems (DS Online), (2000 – 2001). IEEE DS online is IEEE's first online-only magazine. After nine years of publication, DS Online has moved into a new phase as part of Computing Now (<http://computingnow.computer.org>).

4.2.5 Review Panel

- Science Foundation Arizona, Nov. 2010.
- Directorate for Computer & Information Science & Engineering (CISE), NSF, 2007.

4.2.6 Journal Reviewer

- IEEE Transactions on Computers (**Impact Factor: 4.55**)
- IEEE Transactions on Parallel and Distributed Systems (**Impact Factor: 2.17**)
- ACM Transactions on Embedded Computing Systems
- Journal of Parallel and Distributed Computing
- Journal of Systems and Software
- IEEE Communication Letters
- The Computer Journal
- Journal of Cluster Computing
- Journal of Information Science and Engineering
- The Journal of Computers
- IEEE Internet Computing
- ACM/Springer Mobile Networks and Applications

4.2.7 Conference Reviewer

- ICPP04-10, : International Conference on Parallel Processing
- IPCCC05-08: IEEE International Performance Computing and Communications Conference
- IPDPS06: IEEE International Symposium on Parallel and Distributed Processing
- NAS08-10: IEEE International Conference on Networking, Architecture, and Storage
- HiPC05: International Conference on High Performance Computing
- ICCNMC00: International Conference on Computer Network and Mobile Computing
- ICA3PP02: International Conference on Algorithms and Architectures for Parallel Processing
- HCW00: International Heterogeneous Computing Workshop