

Curriculum Vita

Xiao Qin

January 10th, 2012

Address:

Shelby Center for Engineering Technology, Suite 3101E
Samuel Ginn College of Engineering
Department of Computer Science and Software Engineering
Auburn University, Auburn, AL 36834

Phone: (334) 844-6327
Fax: (334) 844-6329

URL: <http://www.eng.auburn.edu/~xqin>
E-Mail: xqin@auburn.edu

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

Aug. 2010 – Present: Associate Professor
Department of Computer Science and Software Engineering
Auburn University.

July 2007 – July 2010: Assistant Professor
Department of Computer Science and Software Engineering
Auburn University.

August 2004 - July 2007: Assistant Professor
Department of Computer Science.
New Mexico Institute of Mining and Technology,

1.4 Honors and Awards

- NSF CAREER Award - U.S. National Science Foundation, 2009.
- Junior Faculty Research Award - Auburn Alumni Engineering Council, 2010.
- 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

- 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 \$1,595,992** awarded after Qin joined Auburn University in July 2007. The seven 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) \$1,882,055

Total External Funding (PI) \$1,681,767 (Research Grants: \$1,604,492 + Equipment: 77,275)

Total Internal Funding (PI) \$200,288

Total Funding (co-PI) \$1,162,180

1. (PI) **NSF CAREER Award**, CCF-0845257.
“CAREER: Multicore-Based Parallel Disk Systems for Large-Scale Data-Intensive Computing”
Duration: 8/2009 – 7/2014
Award Amount: \$400,000
2. (PI) National Science Foundation (NSF) - CISE/CCF, Research Experiences for Undergraduates (REU) Supplemental Grant (supplement to grant CCF-0845257)
Duration: 9/2010 – 8/2011 and 9/2011-8/2012
Award Amount: \$32,000
3. Award Amount: \$28,000 (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 – 8/2012
Auburn Co-PIs: Wei-Shinn Ku and Weikuan Yu
Total Award Amount: \$499,994.
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)
4. (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
5. (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

6. (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
7. (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
8. (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
9. (PI) Auburn University Start-Up Grant
"High-Performance Storage Systems"
Duration: 8/2007 – 6/2012
Award Amount: \$110,288
10. (PI) Intel Research Grant/Award
"SECS: Scheduling in Energy-Efficient Computing Systems"
Duration: 9/2005 – 8/2008
Award Amount: \$58,000
11. (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
12. (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
13. (PI) New Mexico Tech Start-Up Grant
"SARTS: Security-Aware Real-Time Systems"
Duration: 8/2004 – 6/2007
Award Amount: \$80,000
14. (PI) Xilinx University Program, Equipment Grant
"Energy-Efficient Embedded Systems"
Duration: 8/2006 – 7/2007
Award Amount: \$6,170
15. (PI) Huazhong University of Science and Technology Research Grant
"MIND: Modeling Energy Consumption for RAID5 Disk Arrays"
Duration: 5/2009 – 8/2009
Award Amount: \$5,500
16. (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

17. (PI) New Mexico Tech Presidential Research Grant
"Adaptive Quality of Security Control in Storage Systems"
Duration: 8/2005 – 7/2006
Award Amount: \$10,000
18. (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
19. (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
20. (co-PI) National Science Foundation (NSF)
PI: Wei-Shinn Ku; Co-PIs: Xiao Qin, Shiwen Mao, and Alvin Lim
"II-NEW: An Infrastructure for Scalable Data Dissemination and Query Evaluation in Mobile Environments"
Award Amount: \$164,678
21. (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
22. (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

2.2.2 Pending Research Proposals

1. (PI, Pending) National Science Foundation (NSF)
"II-NEW: An Infrastructure to Support Research on High-Performance Storage Systems"
Award Amount: \$264,942

2.3 Publications

(Note: Student Authors 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, which has 14 pages.)

2.3.1 Refereed Book Chapters

1. 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)
2. 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)
 3. Z.-L. Zong*, X.-J. Ruan*, A. A. Manzanares*, 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. 2009. (40%, 12 pages)
 4. **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: **27 journal papers were published or accepted after Qin joined Auburn University in July 2007.** 44 published or accepted for publication. **14 in IEEE Transactions, 6 in ACM Transactions and journals, 5 in JPDC**, 2 in FGCS, 4 in CLUSTER, 1 in JNCA, and 1 in Parco. 2 papers have been revised for the second round review at *IEEE Transactions*. 1 paper has been revised for the second round review at *JPDC*.)

5. X.-J. Ruan*, Q. Yang*, M. I. Alghamdi*, S. Yin*, and **X. Qin**, "ES-MPICH2: A Message Passing Interface with Enhanced Security," *IEEE Transactions on Dependable and Secure Computing*, vol. 9, 2012. Accepted. (30%, 14 pages)
6. Y.-P. Chai, Z.-H. Du, D.A. Bader, and **X. Qin**, "Efficient Data Migration to Conserve Energy in Streaming Media Storage Systems," *IEEE Transactions on Parallel and Distributed Systems*, vol. 23, 2012. Accepted. (30%, 14 pages)
7. X.-M. Zhu, C. He, K.-L. Li, and **X. Qin**, "Adaptive Energy-Efficient Scheduling for Real-Time Tasks on DVS-Enabled Heterogeneous Clusters," *Journal of Parallel and Distributed Computing*, 2012. Accepted. (30%, 12 pages)
8. J.-Y. Li, M. Qiu, Z. Ming, G. Quan, **X. Qin**, and Z.-H. Gue, "Online Optimization for Scheduling Preemptable Tasks on LaaS Cloud Systems," *Journal of Parallel and Distributed Computing*, vol. 72, 2012. Accepted. (20%, 12 pages)
9. A. Manzanares, **X. Qin**, X.-J. Ruan, and S. Yin, "PRE-BUD: Prefetching for Energy-Efficient Parallel I/O Systems with Buffer Disks," *ACM Transactions on Storage*, vol. 7, no. 1, Article 3 June 2011. (40%, 29 pages)
10. X.-M. Zhu, **X. Qin**, and M. Qiu, "QoS-Aware Fault-Tolerant Scheduling for Real-Time Tasks on Heterogeneous Clusters," *IEEE Transactions on Computers*, vol. 60, no. 3, pp. 800-812, March 2011. (30%, 13 pages)
11. J.-Y. Li, Z. Ming, M. Qiu, G. Quan, **X. Qin**, T.-Z. Chen, "Resource Allocation Robustness in Multi-core Embedded Systems with Inaccurate Information," *Journal of Systems Architecture*, Elsevier, vol. 57, no. 9, pp. 840-849, Sept. 2011. (10%, 10 pages)
12. X.-J. Ruan*, S. Yin*, A. Manzanares*, M. Alghamdi*, and **X. Qin**, "A Message Scheduling Scheme for Energy Conservation in Multimedia Wireless Systems," *IEEE Transactions on Systems Man & Cybernetics*, vol. 41, no. 2, pp. 272-283, March 2011. (50%, 12 pages)
13. M. Nijim*, K. Bellam*, Z.-L. Zong*, S. Yin*, X. Qin, "Quality of Security Adaptation in Parallel Disk Systems," *Journal of Parallel and Distributed Computing*, vol. 71, no. 2, pp. 288-301, Feb. 2011. (50%, 14 pages)
14. F.-Y. Shen*, **X. Qin**, M.-T. Sun, and A. Salazar, "A Reliability Model of Energy-Efficient Parallel Disk Systems with Data Mirroring," *International Journal of High Performance Systems Architecture*, Jan. 2010. (40%, 10 pages)
15. Z.-L. Zong*, X.-J. Ruan*, A. Manzanares*, and **X. Qin**, "EAD and PEBD: Two Energy-Aware Duplication Scheduling Algorithms for Parallel Tasks on Homogeneous Clusters," *IEEE Transactions on Computers*, vol. 60, no. 3, pp. 360- 374, March 2011. (30%, 15 pages)
16. **X. Qin**, H. Jiang, A. Manzanares*, X.-J. Ruan*, and S. Yin*, "Dynamic Load Balancing for I/O-Intensive Applications on Clusters," *ACM Transactions on Storage*, vol. 5, no. 3, Aug. 2009. (90%, 38 pages)

17. **X. Qin**, H. Jiang, A. Manzanares*, X.-J Ruan*, and S. Yin*, "Communication-Aware Load Balancing for Parallel Applications on Clusters," *IEEE Transactions on Computers*, vol. 59, no. 1, pp. 42-52, Jan. 2010. (90%, 11 pages)
18. A. Manzanares*, A. Roth*, X.-J Ruan*, S. Yin*, M. Nijim*, and **X. Qin**, "Conserving Energy in Real-Time Storage Systems with I/O Burstiness," *ACM Transactions on Embedded Computing Systems*, vol. 9, no. 3, Feb. 2010. (80%, 21 pages)
19. M. Lin, L. Xu, L.T. Yang, **X. Qin**, N.-G. Zheng, Z.-H. Wu, and M. Qiu, "Static Security Optimization for Real Time Systems," *IEEE Transactions on Industrial Informatics*, vol. 5, no. 1, pp. 22-37, Feb. 2009. (10%, 16 pages)
20. W. Luo*, **X. Qin**, X.-C. Tan, K. Qin, and A. Manzanares*, "Exploiting Redundancies to Enhance Schedulability in Fault-Tolerant and Real-Time Distributed Systems," *IEEE Transactions on Systems Man & Cybernetics, Part A: Systems and Humans*, vol. 39, no. 3, pp. 626-639, May, 2009. (50%, 14 pages)
21. **X. Qin**, M. Alghamdi*, M. Nijim*, Z.-L. Zong*, X.-J. Ruan*, K. Bellam*, and A. A. Manzanares*, "Improving Security of Real-Time Wireless Networks Through Packet Scheduling," *IEEE Transactions on Wireless Communications*, vol. 7, no. 9, pp. 3273-3279, Sept. 2008. (80%, 7 pages)
22. K. Bellam*, A. Manzanares*, X. Ruan*, and **X. Qin***, "Integrating Security and Reliability in Real-time Embedded Systems," *Journal of Autonomic and Trusted Computing*. Accepted March 2008. (70%, 12 pages, the acceptance letter is enclosed)
23. T. Xie* and **X. Qin**, "An Energy-Delay Tunable Task Allocation Strategy for Collaborative Applications in Networked Embedded Systems," *IEEE Transactions on Computers*, vol. 57, no. 3, pp. 329-343, March 2008. (80%, 15 pages)
24. T. Xie* and **X. Qin**, "Security-Aware Resource Allocation for Real-Time Parallel Jobs on Homogeneous and Heterogeneous Clusters," *IEEE Transactions on Parallel and Distributed Systems*, vol. 19, no. 5, pp. 682-697, May 2008. (90%, 16 pages)
25. Z.-L. Zong*, M. Nijim*, and **X. Qin**, "Energy-Efficient Scheduling for Parallel Applications on Mobile Clusters," *Cluster Computing: The Journal of Networks, Software Tools and Applications*, vol. 11, no. 1, pp. 91-113, 2008. (80%, 23 pages)
26. T. Xie* and **X. Qin**, "Stochastic Scheduling for Multiclass Applications with Availability Requirements in Heterogeneous Clusters", *Journal of Cluster Computing*, vol. 11, no. 1, pp. 33-43, March 2008. (90%, 11 pages)
27. **X. Qin** and T. Xie*, "An Availability-Aware Task Scheduling Strategy for Heterogeneous Systems," *IEEE Transactions on Computers*, vol. 57, no. 2, pp. 188-199, Feb. 2008. (90%, 12 pages)
28. **X. Qin**, "Performance Comparisons of Load Balancing Algorithms for I/O-Intensive Workloads on Clusters," *Journal of Network and Computer Applications*, vol. 31, no. 1, pp. 32-46, January 2008. (100%, , 15 pages)
29. **X. Qin**, "Design and Analysis of a Load Balancing Strategy in Data Grids," *Future Generation Computer Systems: The Int'l Journal of Grid Computing*, vol. 23, no. 1, pp. 132-137, Jan. 2007. (Impact Factor: 0.528; source: CiteSeer) (100%, 6 pages)
30. T. Xie* and **X. Qin**, "Performance Evaluation of a New Scheduling Algorithm for Distributed Systems with Security Heterogeneity," *Journal of Parallel and Distributed Computing*, vol. 67, no. 10, pp. 1067-1081, October 2007. (80%, 15 pages)
31. M. Nijim*, Z.L. Zong*, and **X. Qin**, "StReD: A Quality of Security Framework for Storage Resources in Data Grids," *Future Generation Computer Systems: The Int'l Journal of Grid Computing*, vol. 23, no. 6, pp. 816-824, July 2007. (80%, 9 pages)
32. T. Xie* and **X. Qin**, "Improving Security for Periodic Tasks in Embedded Systems through Scheduling," *ACM Transactions on Embedded Computing Systems*, vol. 6, no. 1, Article No. 20, 2007. (80%, 22 pages)
33. **X. Qin**, "Design and Analysis of a Load Balancing Strategy in Data Grids," *Future Generation Computer Systems: The Int'l Journal of Grid Computing*, vol. 23, no. 1, pp. 132-137, Jan. 2007. (Impact Factor: 0.528; source: CiteSeer) (100%, 6 pages)
34. M. Nijim*, **X. Qin**, and T. Xie*, "Modeling and Improving Security of a Local Disk System for Write-Intensive Workloads," *ACM Transactions on Storage*, vol. 2, no. 4, pp. 400-423, Nov. 2006. (80%, 24 pages)
35. T. Xie* and **X. Qin**, "Scheduling Security-Critical Real-Time Applications on Clusters," *IEEE*

- Transactions on Computers*, vol. 55, no. 7, pp. 864-879, July 2006. (80%, 16 pages)
36. X. Qin and H. Jiang, "A Novel Fault-tolerant Scheduling Algorithm for Precedence Constrained Tasks in Real-Time Heterogeneous Systems," *Parallel Computing*, vol. 32, no. 5-6, pp. 331-356, June 2006. (80%, 26 pages)
 37. T. Xie*, X. Qin, "Security-Driven Scheduling for Data-Intensive Applications on Grids," *Journal of Cluster Computing*, vol. 10, no. 2, pp. 145-153, 2007. (**Impact Factor**: 0.99; top 295, top 24.16%; source: CiteSeer) (70%, 9 pages)
 38. T. Xie*, X. Qin, "A Security Middleware Model for Real-time Applications on Grids," *IEICE Transactions on Information and Systems*, Special Issue on Parallel/Distributed Computing and Networking, Feb. 2006. (**Acceptance Rate** 28.6%, 40/140). (60%, 12 pages)
 39. T. Xie*, X. Qin, A. Sung, M. Lin, and L. T. Yang, "Real-Time Scheduling with Quality of Security Constraints," *International Journal of High Performance Computing and Networking*, vol. 4, no. 3/4, pp. 188-197, 2006. (70%, 10 pages)
 40. T. Xie*, X. Qin, M. Lin, "Open Issues and Challenges in Security-aware Real-Time Scheduling for Distributed Systems," *Journal on Information*, Vol. 9, No. 2, pp. 309-322. (70%, 14 pages)
 41. M. Nijim*, T. Xie*, and X. Qin, "Performance Analysis of An Admission Controller for CPU- and I/O-Intensive Applications in Self-Managing Computer Systems," *ACM Operating Systems Review*, vol. 39, no. 4, Oct. 2005. (**Impact Factor**: 0.71; top 463, top 37.91%; source: CiteSeer) (90%, 10 pages)
 42. X. Qin and H. Jiang, "A Dynamic and Reliability-driven Scheduling Algorithm for Parallel Real-time Jobs on Heterogeneous Clusters," *Journal of Parallel and Distributed Computing*, vol. 65, no. 8, pp. 885-900, Aug. 2005. (80%, 16 pages)
 43. X. Qin, H. Jiang, Y. Zhu, and D. R. Swanson. "Improving the Performance of I/O-Intensive Applications on Clusters of Workstations," *Cluster Computing: The Journal of Networks, Software Tools and Applications*, Special Issue on Cluster Computing in Science and Engineering, vo. 9, no. 3, pp. 297-311, July 2006. (**Impact Factor**: 0.99, top 295, top 24.16%, source: CiteSeer) (80%, 15 pages)
 44. X. Qin, H. Jiang, Y. Zhu, and D. R. Swanson, "A Feedback Control Mechanism for Balancing I/O- and Memory-Intensive Applications on Clusters," *Scalable Computing: Practice and Experience*, ISSN 1895-1767, vol. 6, no. 4, pp. 95-107, 2005. (80%, 13 pages)
 45. Y. Zhu, H. Jiang, X. Qin, D. Feng, and D. Swanson, "Exploiting Redundancy to Boost Performance in a RAID-10 Style Cluster-based File System," *Cluster Computing: The Journal of Networks, Software Tools and Applications*, vol. 9, no. 4, pp. 433-447, 2006. (**Impact Factor**: 0.99, top 295, top 24.16%, source: CiteSeer) (30%, 15 pages)
 46. Y. Zhu, H. Jiang, X. Qin, and D. R. Swanson. "A Case Study of Parallel I/O for Biological Sequence Search on Linux Clusters," *International Journal of High Performance Computing and Networking*, vol. 1, no. 4, pp. 214 – 222, July 2004. (30%, 9 pages)
 47. X. Qin, "Delayed Consistency Model for Distributed Interactive Systems with Real-time Continuous Media," *Journal of Software*, vol. 13, no.6, 2002, pp. 1029-1039. (100%, 11 pages)
 48. X. Qin, "A Fault-Tolerant Support in Real-Time Collaborative Editing Systems," *IEEE Distributed Systems Online*, vol.2, no.1, 2001.

2.3.3 Refereed Conference Papers

(Note: 41 conference papers were published or accepted after Qin joined Auburn University in July 2007. 89 papers have been published or accepted for publication. 52 are in competitive referred conferences and 37 are in other referred conferences and workshops. There is no page number for conference papers appeared in electronic proceedings.)

49. S. Yin*, M. I. Alghamdi*, X.-J. Ruan, Y. Tian*, J. Xie*, X. Qin, and M. Qiu, "Reliability Analysis for an Energy-Aware RAID System," *Proc. the 30th IEEE International Performance Computing and Communications Conference (IPCCC)*, Nov. 2011. (40%, 8 pages)
50. Y. Tian*, M. I. Alghamdi*, S. Yin*, J. Xie*, J. Zhang*, M. Qiu, Y.-M. Yang, X. Qin, "Secure Fragment Allocation in a Distributed Storage System with Heterogeneous Vulnerabilities," *Proc. the 6th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 2011. (40%, 10 pages)

51. Y. Tian*, M. I. Alghamdi*, J. Xie*, S. Yin*, J. Zhang*, M. Qiu, Y.-M. Yang, **X. Qin**, "A Secure File Allocation Algorithm for Heterogeneous Distributed Systems," *Proc. the International Conference on Parallel Processing Workshops*, the 3rd Int'l Workshop on Security in Cloud Computing (CloudSec), Sept. 13-16, 2011. (30%, 6 pages)
52. Z. Liu*, J. Zhou*, W.-K. Yu, F. Wu, **X. Qin**, C.-X. Xie, "MIND: A black-box energy consumption model for disk arrays," *Intl' Green Computing Conference and Workshops (IGCC)*, 25-28 July 2011. (25%, 6 pages).
53. Z.-L. Zong*, X.-J. Ruan*, M. Nijim*, and **X. Qin**, "Heat-Based Dynamic Data Caching: A Load Balancing Strategy for Energy- Efficient Parallel Storage Systems with Buffer Disks", *Proc. the 27th IEEE Symposium on Massive Storage Systems and Technologies: Research Track (MSST)*, May 2011. (30%, 6 pages)
54. J. Lewis*, M. I. Alghamdi*, M. A. Assaf*, X.-J. Ruan*, Z.-Y. Ding*, and **X. Qin**, "An Automatic Prefetching and Caching System," *Proc. the 29th International Performance Computing and Communications Conference (IPCCC)*, Albuquerque, New Mexico, Dec. 2010. (40%, 8 pages)
55. X.-J. Ruan*, Q. Yang*, M. I. Alghamdi*, S. Yin*, Z.-Y. Ding*, J. Xie*, J. Lewis*, and **X. Qin**, "ES-MPICH2: A Message Passing Interface with Enhanced Security," *Proc. the 29th International Performance Computing and Communications Conference (IPCCC)*, Albuquerque, New Mexico, Dec. 2010. (40%, 8 pages)
56. M. Qiu, J.-W. Niu, L. T. Yang, **X. Qin**, S.-L. Zhang, and B. Wang, "Energy-Aware Loop Parallelism Maximization for Multi-Core DSP Architectures," *Proc. IEEE/ACM International Conference on Green Computing and Communications (GreenCom-2010)*, Hangzhou, China, Dec 18-20, 2010. (**Best Paper Award**. 16%, 8 pages)
57. Q. Yang*, X.-J. Ruan*, A. Lim, and **X. Qin**, "Location Privacy Protection in Contention Based Forwarding for VANETs," *Proc. IEEE Globecom 2010 Wireless Networking Symposium*, Miami, FL, Dec. 6-10, 2010. (**Acceptance Rate: 35%**, 1300/3688) (10%, 8 pages)
58. A. Manzanares*, X.-J. Ruan*, S. Yin*, J. Xie*, Z.-Y. Ding*, Y. Tian*, J. Majors*, and **X. Qin**, "Energy Efficient Prefetching with Buffer Disks for Cluster File Systems," *Proc. IEEE International Conference on Parallel Processing (ICPP)*, San Diego, CA, Sept. 13-16, 2010. (40%, 10 pages)
59. M. Nijim, Z.-L. Zong, **X. Qin**, Y. Nijim, "Multi-Layer Prefetching for Hybrid Storage Systems: Algorithms, Models, and Evaluations," *Proc. IEEE International Conference on Parallel Processing Workshops (ICPPW)*, San Diego, CA, Sept. 13-16, 2010. (10%, 6 pages)
60. S. Yin*, M. I. Alghamdi*, X.-J. Ruan*, M. Nijim, A. Tamilarasan*, Z.-L. Zong*, **X. Qin**, and Y.-M. Yang, "Improving Energy Efficiency and Security for Disk Systems," *Proc. 12th IEEE International Conference on High Performance Computing and Communications (HPCC-10)*, Melbourne, Australia, September 1-3, 2010. (**Acceptance Rate: 19%**, 58/304) (40%, 8 pages).
61. Z. Liu*, F. Wu, **X. Qin**, C.-S. Xie, J. Zhou*, and J.-Z. Wang*, "TRACER: A Trace-Replay Based Load-controllable Scheme for Evaluating Energy-efficiency of Mass Storage Systems," *Proc. IEEE International Conference on Cluster Computing (CLUSTER)*, Heraklion, Crete, Greece, Sept. 20-24, 2010. (40%, 10 pages)
62. J. Li, M. Qiu, J. Niu, W. Gao, Z. Zong, and **X. Qin**, "Feedback Dynamic Algorithms for Preemptable Job Scheduling in Cloud Systems", *Proc. 2010 IEEE/WIC/ACM International Conference on Web Intelligence*, pp. 561-564. Toronto, Canada, Sep. 2010. (10%, 4 pages)
63. P. Wang*, D. Hu, C.-S. Xie, J.-Z. Wang*, and **X. Qin**, "A Fine-grained Data Reconstruction Algorithm for Solid-state Disks," *Proc. the 5th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 2010. (**Acceptance Rate: 24%**, 43/178) (20%, 8 pages)
64. J. Xie*, S. Yin*, X.-J. Ruan*, Z.-Y. Ding*, Y. Tian*, J. Majors*, A. Manzanares*, and **X. Qin**, "Improving MapReduce Performance via Data Placement in Heterogeneous Hadoop Clusters," *Proc. 19th International Heterogeneity in Computing Workshop*, Atlanta, Georgia, April 2010. (40%, 8 pages)
65. X.-J. Ruan*, S. Yin*, A. Manzanares*, J. Xie*, Z.-Y. Ding*, J. Majors*, and **X. Qin**, "ECOS: An Energy-Efficient Cluster Storage System," *Proc. the 28th International Performance Computing and Communications Conference (IPCCC)*, Phoenix, Arizona, Dec. 2009. (40%, 8 pages)
66. S. Yin*, X.-J. Ruan*, A. Manzanares*, Z.-Y. Ding*, J. Xie*, J. Majors*, **X. Qin**, "Improving Reliability of Energy-Efficient Storage Systems by Disks Swapping," *Proc. the 28th International Performance Computing and Communications Conference (IPCCC)*, Phoenix, Arizona, Dec. 2009. (40%, 8 pages)

67. X.-J. Ruan*, A. Manzanares*, S. Yin*, Z. -L. Zong*, and **X. Qin**, "Performance Evaluation of Energy-Efficient Parallel I/O Systems with Write Buffer Disks," *Proc. the 38th Int'l Conf. on Parallel Processing (ICPP)*, Vienna, Austria, Sept. 2009. (**Acceptance Rate: 32.3%**, 71/220) (40%, 8 pages)
68. S. Yin*, X.-J. Ruan*, A. Manzanares*, X. Qin, "How Reliable are Parallel Systems When Energy-Efficient Schemes are Involved?" *Proc. IEEE International Conference on Cluster Computing (CLUSTER)*, New Orleans, LA, Aug. 31-Sept. 4, 2009. (Received an **NSF Student Travel Award** by a Student Lead Author) (50%, 8 pages)
69. M. Nijim*, A. Manzanares*, X.-J. Ruan*, and **X. Qin**, "HYBUD: An Energy-Efficient Architecture for Hybrid Parallel Disk Systems," *Proc. the 18th Int'l Conf. on Computer Communications and Networks (ICCCN)*, San Francisco, CA, Aug. 2009. (**Acceptance Rate: 29%**). (30%, 8 pages)
70. A. Manzanares*, X.-J. Ruan*, S. Yin*, M. Nijim*, **X. Qin**, and W. Luo, "Energy-Aware Prefetching for Parallel Disk Systems: Algorithms, Models, and Evaluation," *Proc. the 8th IEEE International Symposium on Network Computing and Applications (NCA)*, July 2009. (50%, 8 pages)
71. X.-J. Ruan*, A. Manzanares*, S. Yin*, M. Nijim*, and **X. Qin**, "Can We Improve Energy Efficiency of Secure Disk Systems without Modifying Security Mechanisms?" *Proc. the 4th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 2009. (**Acceptance Rate: 24%**, 43/178) (50%, 8 pages)
72. F.-Y. Shen*, A. Manzanares*, K. Bellam*, and **Xiao Qin**, "A Reliability Model of Energy-Efficient Parallel Disk Systems with Data Mirroring," *Proc. 6th International Conference on Information Technology: New Generations*, April 2009. (50%, 8 pages)
73. X.-J. Ruan*, A. Manzanares*, K. Bellam*, **X. Qin**, "DARAW: A New Write Buffer to Improve Parallel I/O Energy-Efficiency," *Proc. the 24th Annual ACM Symposium on Applied Computing (SAC)*, March 2009. (**Acceptance Rate: 29%**) (50%, 8 pages)
74. C. Liu*, **X. Qin**, S. Kulkarni, C.-J. Wang, S. Li, A. Manzanares*, and S. Baskiyar, "Distributed Energy-Efficient Scheduling for Data-Intensive Applications with Deadline Constraints on Data Grids," *Proc. 27th IEEE International Performance Computing and Communications Conference (IPCCC)*, Dec. 2008. . (**Acceptance Rate: 29.8%**, 42/141) (20%, 8 pages)
75. M. Nijim*, A. Manzanares*, and **X. Qin**, "An Adaptive Energy-Conserving Strategy for Parallel Disk Systems," *Proc. the 12th IEEE Int'l Symp. Distributed Simulation and Real Time Applications (DS-RT)*, Oct. 2008. (30%, 8 pages)
76. A. Tamilarasan, M.K. Shankarapani, **X. Qin**, S. Mukkamala, and A.H. Sung, "Integrating Energy Efficiency and Security for Storage Systems," *IEEE Int'l Conf. Systems, Man and Cybernetics*, pp.2396-2400, 12-15 Oct. 2008. (40%, 5 pages)
77. M. Nijim*, Z.L. Zong*, K. Bellam*, X.-J. Ruan* and **X. Qin**, "Security-Aware Cache Management for Cluster Storage Systems," *Proc. the 17th Int'l Conf. Computer Communications and Networks (ICCCN)*, St. Thomas, Virgin Islands, Aug. 2008. (**Acceptance rate 26%**) (50%, 8 pages)
78. C. Liu*, **X. Qin**, and S. Li, "PASS: Power-Aware Scheduling of Mixed Applications with Deadline Constraints on Clusters," *Proc. the 17th Int'l Conf. Computer Communications and Networks (ICCCN)*, St. Thomas, Virgin Islands, Aug. 2008. (**Acceptance rate 26%**) (20%, 8 pages)
79. A. Roth*, A. Manzanares*, K. Bellam*, M. Nijim*, and X. Qin, "Energy Conservation for Real-Time Disk Systems with I/O Burstiness," *Proc. IEEE Int'l Workshop Next Generation Autonomous Storage and High Performance Computing*, St. Thomas, Virgin Islands, Aug. 2008. (30%, 8 pages)
80. A. Manzanares*, D. Hamilton, and X. Qin, "The Relationship Between Software Architecture and Visual Programming Languages," *Proc. Grand Challenges in Modeling & Simulation*, Edinburgh, Scotland, June 2008. (5%, 6 pages)
81. K. Bellam*, A. Manzanares*, X. Ruan*, **X. Qin**, and Y.-M. Yang, "Improving Reliability and Energy Efficiency of Disk Systems via Utilization Control," *Proc. IEEE Symposium on Computers and Communications (ISCC'08)*, July 2008. (**Best Paper Award. Acceptance Rate: 47%**, 165/350) (50%, 8 pages)
82. A. Manzanares*, K. Bellam*, and **X. Qin**, "A Prefetching Scheme for Energy Conservation in Parallel Disk Systems," *Proc. NSF Next Generation Software Program Workshop*, April 2008. (30%, 6 pages)
83. K. Bellam*, A. Manzanares*, and **X. Qin**, Improving Reliability and Energy Efficiency of Disk Systems. *Proc. 46th ACM Southeast Conference*, March 2008. (20%, 6 pages)
84. Z.L. Zong*, K. Bellam*, X.-J. Ruan*, A. Manzanares*, **X. Qin**, and Y.-M Yang, "A Simulation

- Framework for Energy-efficient Data Grids,” *Proc. Winter Simulation Conference*, Washington, D.C., Dec. 2007. (50%, 6 pages)
85. Z.L. Zong*, **X. Qin**, M. Nijim*, X.-J. Ruan*, K. Bellam*, and M. Alghamdi*, “Energy-Efficient Scheduling for Parallel Applications Running on Heterogeneous Clusters,” *Proc. 36th International Conference on Parallel Processing (ICPP)*, Sept. 2007. (**Acceptance Rate: 25%**) (80%, 8 pages)
 86. X.-J. Ruan*, **X. Qin**, M. Nijim*, Z.L. Zong*, and K. Bellam*, “An Energy-Efficient Scheduling Algorithm Using Dynamic Voltage Scaling for Parallel Applications on Clusters,” *Proc. 16th IEEE Int’l Conference on Computer Communications and Networks (ICCCN)*, Honolulu, Hawaii, Aug. 2007. (**Acceptance Rate: 29%**) (80%, 8 pages)
 87. K. Bellam*, R.K. Vudata*, **X. Qin**, Z.L. Zong*, M. Nijim*, and X.-J. Ruan*, “Interplay of Security and Reliability using Non-Uniform Checkpoints,” *Proc. 16th IEEE Int’l Conference on Computer Communications and Networks (ICCCN)*, Honolulu, Hawaii, Aug. 2007. (**Acceptance Rate: 29%**) (80%, 8 pages)
 88. W. Luo*, F.-M. Yang, L.-P. Pang, G. Tu, and **X. Qin**, “TERCOS: A Novel Approach to Exploiting Redundancies in Fault-Tolerant and Real-Time Distributed Systems,” *Proc. 13th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*, Daegu, Korea, Aug. 2007. (**Acceptance Rate: 30%**, 42/142) (25%, , 8 pages)
 89. Z.L. Zong*, M.E. Briggs, N.W. O’Connor, **X. Qin**, M. Alghamdi*, and Y.-M. Yang, “Design and Performance Analysis of Energy-Efficient Parallel Storage Systems,” *Commodity Cluster Symposium 2007 (CCS)*, Annapolis, Maryland, July 2007. (50%, 2 pages)
 90. **X. Qin**, M. Alghamdi*, M. Nijim*, and Z.L. Zong*, “Scheduling of Periodic Packets in Energy-Aware Wireless Networks,” *Proc. the 26th IEEE Int’l Performance Computing and Communications Conf. (IPCCC’07)*, New Orleans, Louisiana, April 2007. (**Acceptance Rate: 37%**) (80%, 8 pages)
 91. W. Luo*, **X. Qin**, and K. Bellam*, “Reliability-Driven Scheduling of Periodic Tasks in Heterogeneous Real-Time Systems,” *Proc. the 4th IEEE International Symposium on Embedded Computing*, Ontario, Canada, May 2007. (30%, 8 pages)
 92. K. Bellam*, Z.-L. Zong*, M. Alghamdi*, M. Nijim*, and **X. Qin**, “Integrating Fault Recovery and Quality of Security in Real-time Systems,” *Proc. IEEE International Symposium on Ubisafe Computing*, Ontario, Canada, May 2007. (**Nokia Student Travel Award**) (80%, 8 pages)
 93. Z.-L. Zong*, M.E. Briggs*, N.W. O’Connor*, and **X. Qin**, “An Energy-Efficient Framework for Large-Scale Parallel Storage Systems,” *Proc. 21st Int’l Parallel and Distributed Processing Symp. (IPDPS), 8th IEEE Int’l Workshop Parallel and Distributed Scientific and Engineering Computing*, Long Beach, CA, March 2007. (80%, 6 pages)
 94. Z.L. Zong*, M. Nijim*, M. Alghamdi*, and **X. Qin**, “HAGEES: A High Availability Guaranteed Energy-Efficient Scheduling Strategy for High-Performance Clusters,” *Proc. 2006 the 7th Symposium of the Los Alamos Computer Science Institute*, Santa Fe, NM, Oct. 2006. (80%, 6 pages)
 95. T. Xie* and **X. Qin**, “A Security-Oriented Task Scheduler for Heterogeneous Distributed Systems,” *Proc. 13th Annual IEEE International Conference on High Performance Computing (HiPC)*, pp. 35-46, Bangalore, India, Dec. 18-21, 2006. (**Acceptance Rate: 15%**, 52/335; **Impact Factor: 0.16**, top 981, top 80.34%, source: CiteSeer) (80%, 12 pages)
 96. M. Nijim*, **X. Qin**, and T. Xie*, “Adaptive Quality of Security Control in Networked Parallel Disk Systems,” *Proc. 15th International Conference on Computer Communications and Networks (ICCCN’06)*, Arlington, Virginia, Oct. 2006. (**Acceptance Rate: 32%**, 71/221, **IEEE Student Travel Award**) (80%, 8 pages)
 97. Z.L. Zong*, A. Manzanares*, B. Stinar*, and **X. Qin**, “Energy-Efficient Duplication Strategies for Scheduling Precedence Constrained Parallel Tasks on Clusters,” *Proc. IEEE 8th International Conference on Cluster Computing (Cluster’06)*, Sept. 2006. (**Acceptance Rate: 33%**, 42/127; **Best Paper Award Nomination; IEEE TCSC Student Travel Award**) (80%, 8 pages)
 98. W. Luo*, F.-M. Yang, L.-P. Pang, and **X. Qin**, “Fault-Tolerant Scheduling Based on Periodic Tasks for Heterogeneous Systems,” *Lecture Notes in Computer Science (LNCS 4158)*, Autonomic and Trusted Computing, ISSN: 0302-9743, ISBN: 978-3-540-38619-3, Springer, 2006. (*Proc. 3rd Int’l Conf. Autonomic and Trusted Computing*, Sept. 2006. **Acceptance Rate 27.6%**, 62/225) (25%, 8 pages)
 99. T. Xie* and **X. Qin**, “Stochastic Scheduling with Availability Constraints in Heterogeneous Systems,” *Proc. IEEE 8th International Conference on Cluster Computing (Cluster’06)*, Sept. 2006. (**Acceptance Rate: 33%**, 42/127) (80%, 8 pages)

100. T. Xie*, X. Qin, and M. Nijim*, "Solving Energy-Latency Dilemma: Task Allocation for Parallel Applications in Heterogeneous Embedded Systems," *Proc. 35th International Conference on Parallel Processing (ICPP)*, Columbus, Ohio, Aug. 2006. (**Acceptance Rate: 32%**, 64/200; **Impact Factor: 0.95**, top 313, top 25.63%, source: CiteSeer) (80%, 8 pages)
101. M. Nijim*, T. Xie*, Z.L. Zong*, and X. Qin, "An Adaptive Strategy for Secure Distributed Disk Systems," NASA/IEEE Conference on Mass Storage Systems and Technologies, Work-in-Progress Session, May 2006. (80%, 4 pages)
102. T. Xie* and **X. Qin**, "SAHA: A Scheduling Algorithm for security-Sensitive Jobs on Data Grids," *Proc. IEEE/ACM 6th Int'l Symp. Cluster Computing and the Grid (CCGrid)*, 2nd Int'l Workshop on Cluster Security, May 2006. (**Acceptance Rate: 25%**) (80%, 8 pages)
103. T. Xie* and **X. Qin**, "SHARP: A New Real-Time Scheduling Algorithm to Improve Security of Parallel Applications on Heterogeneous Clusters," *Proceedings of the 25th IEEE International Performance Computing and Communications Conference (IPCCC'06)*, Phoenix, AZ, April 2006. (**Acceptance Rate: 35%**) (80%, 8 pages)
104. M. Nijim*, **X. Qin**, T. Xie*, and M. Alghamdi*, "Awards: An Adaptive Write Scheme for Secure Local Disk Systems," *Proceedings of the 25th IEEE International Performance Computing and Communications Conference (IPCCC'06)*, Phoenix, AZ, April 2006. (**Acceptance Rate: 35%**) (80%, 8 pages)
105. T. Xie* and **X. Qin**, "Incorporating Security into Real-Time Scheduling for Parallel Jobs on Clusters," *the 26th IEEE Real-Time Systems Symposium (RTSS'05)*, Work-in-Progress Session, Miami, FL, Dec. 2005. (**Impact Factor of RTSS: 1.57**, top 94, top 7.69%, source: CiteSeer) (80%, 4 pages)
106. T. Xie*, **X. Qin**, and A. Sung, "An Approach to Satisfying Security Needs of Periodic Tasks in High Performance Embedded Systems," *the 12th IEEE International Conference on High Performance Computing (HiPC'05)*, poster session, Goa, India, Dec. 2005. (**Impact Factor of HiPC: 0.16**, top 981, top 80.34%, source: CiteSeer) (80%, 8 pages)
107. M. Alghamdi*, T. Xie*, **X. Qin**, "PARM: A Power-Aware Message Scheduling Algorithm for Real-Time Wireless Networks," *ACM Workshop on Wireless Multimedia Networking and Performance Modeling*, in conjunction with the *8th Int'l Symp. Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2005)*, pp. 86-92, Oct. 2005, Montreal, Quebec, Canada. (**Acceptance Rate: 43%**, 18/41) (90%, 7 pages)
108. T. Xie* and **X. Qin**, "A New Allocation Scheme for Parallel Applications with Deadline and Security Constraints on Clusters," *the 7th IEEE International Conference on Cluster Computing (Cluster 2005)*, September 27-30, 2005, Boston, USA. (**Acceptance Rate: 32%**, 48/150) (80%, 8 pages)
109. T. Xie* and **X. Qin**, "Towards a Security Service Integration Framework for Distributed Real-Time Systems," *the 18th International Conference on Parallel and Distributed Computing Systems*, September 12-14, 2005. (80%, 8 pages)
110. T. Xie* and **Xiao Qin**, "Enhancing Security of Real-Time Applications on Grids through Dynamic Scheduling," *Lecture Notes in Computer Science (LNCS 3834)*, ISSN: 0302-9743, ISBN: 3-540-31024-X, Springer, August 2005, pp. 219-237, Editors: Dror Feitelson, Eitan Frachtenberg, Larry Rudolph and Uwe Schwiegelshohn. (*Proc. the 11th Workshop on Job Scheduling Strategies for Parallel Processing (JSSPP'05)*, pp.146-158, Cambridge, MA, June 2005; **ACM Student Travel Award; Impact Factor: 2.15**, top 19, top 1.55%, source: CiteSeer) (80%, 19 pages)
111. M. Nijim*, T. Xie*, and **X. Qin**, "Integrating a Performance Model in Self-Managing Computer Systems under Mixed Workload Conditions," *Proceedings of the IEEE International Conference on Information Reuse and Integration*, August 15-17, 2005. (80%, 8 pages)
112. T. Xie*, **X. Qin**, and A. Sung, "SAREC: A Security-Aware Scheduling Strategy for Real-Time Applications on Clusters," *the 34th International Conference on Parallel Processing (ICPP 2005)*, pp.5-12, Norway, June 14-17, 2005. (**Acceptance Rate: 28%**, 69/241; **Impact Factor: 0.95**, top 313, top 25.63%, source: CiteSeer) (80%, 8 pages)
113. T. Xie*, **X. Qin**, and A. Sung, "Integrating Security Requirements into Scheduling for Real-Time Applications in Grid Computing," *Proceedings of the International Conference on Grid Computing and Applications*, pp.24-30, June 20-23, 2005. (**Acceptance Rate: 36%**) (80%, 7 pages)
114. **X. Qin** and Hong Jiang, "Improving Effective Bandwidth of Networks on Clusters using Load Balancing for Communication-Intensive Applications," *Proceedings of the 24th IEEE International*

- Performance, Computing, and Communications Conference (IPCCC 2005)*, pp.27-34, Phoenix, Arizona, April 7-9, 2005. (**Acceptance Rate: 35%**, 36/103) (80%, 8 pages)
115. **X. Qin**, "Improving Network Performance through Task Duplication for Parallel Applications on Clusters," *Proceedings of the 24th IEEE International Performance, Computing, and Communications Conference (IPCCC 2005)*, pp.35-42, Phoenix, Arizona, April 7-9, 2005. (**Acceptance Rate: 35%**, 36/103) (80%, 8 pages)
 116. **X. Qin**, T. Xie*, A. Nathan, and V. K. Tadepalli, "Benchmarking the CLI for I/O Intensive Computing," *Proceedings of the 19th International Parallel and Distributed Processing Symposium (IPDPS'05), the 6th Int'l Workshop on Parallel and Distributed Scientific and Engineering Computing*, IEEE/ACM, April 4-8, 2005. (**Acceptance Rate: 36%**, **Impact Factor: 0.20**, top 912, top 74.69%, source: CiteSeer) (80%, 6 pages)
 117. T. Xie*, A. Sung, and **X. Qin**, "Dynamic Task Scheduling with Security Awareness in Real-Time Systems", *Proceedings of the 19th International Parallel and Distributed Processing Symposium (IPDPS'05), the 4th Int'l Workshop on Performance Modeling, Evaluation, and Optimization of Parallel and Distributed Systems*, IEEE/ACM, April 4-8, 2005. (**Acceptance Rate: 59%**; **IEEE TCPP Student Travel Award**; **Impact Factor: 0.20**, top 912, top 74.69%, source: CiteSeer) (80%, 8 pages)
 118. **X. Qin** and Hong Jiang, "Improving the Performance of Communication-Intensive Parallel Applications Executing on Clusters," *Proceedings of the 2004 IEEE International Conference on Cluster Computing (Cluster 2004)*, Poster Session, San Diego, California, September 20-23, 2004. (80%, 1 page)
 119. **X. Qin**, H. Jiang, Y. Zhu, and D. Swanson, "Dynamic Load Balancing for I/O-Intensive Tasks on Heterogeneous Clusters," *Proceedings of the 10th International Conference on High Performance Computing (HiPC'03)*, pp.300-309, Dec.17-20, 2003, Hyderabad, India. (**Acceptance Rate: 29%**; **Impact Factor: 0.16**, top 981, top 80.34%, source: CiteSeer) (80%, 10 pages)
 120. **X. Qin**, H. Jiang, Y. Zhu, and D. Swanson, "Towards Load Balancing Support for I/O-Intensive Parallel Jobs in a Cluster of Workstations," *Proceedings of the 5th IEEE International Conference on Cluster Computing (Cluster 2003)*, pp. 100-107, Hong Kong, Dec. 1-4, 2003. (**Acceptance Rate: 29%**) (80%, 8 pages)
 121. Y. Zhu, H. Jiang, **X. Qin**, and D. Swanson, "A Case Study of Parallel I/O for Biological Sequence Analysis on Linux Clusters", *Proceedings of the 5th IEEE International Conference on Cluster Computing (Cluster 2003)*, pp.100-107, Hong Kong, Dec. 1-4, 2003. (**Acceptance Rate: 29%**) (10%, 8 pages)
 122. **X. Qin**, H. Jiang, Y. Zhu, and D. Swanson, "Boosting Performance for I/O-Intensive Workload by Preemptive Job Migrations in a Cluster System," *Proceedings of the 15th Symposium on Computer Architecture and High Performance Computing*, Nov.10-12, 2003, Brazil. IEEE Press. (**Acceptance Rate: 30%**) (80%, 8 pages)
 123. **X. Qin**, H. Jiang, Y. Zhu, and D. Swanson, "A Dynamic Load Balancing Scheme for I/O-Intensive Applications in Distributed Systems," *Proceedings of the 32nd International Conference on Parallel Processing Workshops (ICPP'03 Workshops)*, pp.79-86, Taiwan, China, Oct. 6-9, 2003. IEEE Press. **Impact Factor: 0.18**, top 944, top 77.31%, source: CiteSeer) (80%, 8 pages)
 124. Y. Zhu, H. Jiang, **X. Qin**, and D. Swanson, "Design, Implementation, and Performance evaluation of a Cost-Effective Fault-Tolerant Parallel Virtual File System," *International Workshop on Storage Network Architecture and Parallel I/Os*, in conjunction with the 12th Int'l Conf. on Parallel Architectures and Compilation Techniques (PACT'03), Sept. 27 - Oct. 1, 2003, New Orleans, LA. (**Acceptance Rate: 56%**) (10%, 8 pages)
 125. **X. Qin**, H. Jiang, Y. Zhu, and D. Swanson, "Dynamic Load balancing for I/O- and Memory-Intensive workload in Clusters using a Feedback Control Mechanism," *Proceedings of the 9th International Euro-Par Conference on Parallel Processing (Euro-Par'03)*, pp. 224-229. Klagenfurt, Austria, Aug. 26-29, 2003. (**Acceptance Rate: 46%**; **Impact Factor: 0.67**, top 491, top 40.21%, source: CiteSeer)) (80%, 6 pages)
 126. Y. Zhu, H. Jiang, **X. Qin**, D. Feng, and D. Swanson, "Scheduling for improved write performance in a Cost-Effective, Fault-Tolerant Parallel Virtual File System (CEFT-PVFS)," *ClusterWorld Conference and Expo Partners with the Fourth LCI International Conference on Linux Clusters: The HPC Revolution 2003*, San Jose, California, June 24-26, 2003. (10%, 8 pages)
 127. Y. Zhu, H. Jiang, **X. Qin**, D. Feng, and D. Swanson, "Improved Read Performance in CEFT-

- PVFS: Cost Effective, Fault-Tolerant Parallel Virtual File System," *Proceedings of IEEE/ACM CCGrid 2003*, pp.730-735. *Workshop on Parallel I/O in Cluster Computing and Computational Grids*, Japan, May 2003. (10%, 6 pages)
128. **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)
 129. **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)
 130. **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)
 131. **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)
 132. **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)
 133. **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)
 134. **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)
 135. **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)
 136. **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)
 137. **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

138. **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)
139. **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)
140. Sumanth J.V, **X. Qin**, A. Qadi and H. Jiang, "Performance Evaluation of Parallel I/O in Cluster Environments," *Technical Report TR-UNL-CSE 2002-0502*, Department of Computer Science and Engineering, University of Nebraska-Lincoln, May 2002.
141. **X. Qin**, "Fault-Tolerant Support in Real-Time Collaborative Editing Systems," *IEEE Distributed Systems Online*, Vol.2, No.1, 2001, IEEE Computer Society.

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

142. **X. Qin** and L. Pang, "An Automatic Testing System of Scheduling Strategies in Real-Time UNIX," *Journal of Systems Engineering and Electronics*, 1999, China.
143. **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)
144. **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.
145. **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)
146. **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)
147. **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.

2.3.5 Submitted Journal Papers

1. **X. Qin** and M. Nijim, "A Quality of Security Framework for Storage Resources in a Grid Environment," *Future Generation Computer Systems: The Int'l Journal of Grid Computing*. Submitted April 2010. (90%)
2. A. Roth, T. Xie, M. Nijim and **X. Qin**, "Energy Management for Real-Time Embedded Storage Systems with I/O Burstiness," *ACM Transactions on Embedded Computing Systems*. Submitted Feb. 2010. (30%)
3. T. Xie and **X. Qin**, "Enhancing Security of Real-Time Applications on Grids through Dynamic Scheduling," *IEEE Transactions on Secure and Dependable Computing*. Submitted in March 2006. (50%)

2.4 Invited Talks/Conference Talks

(Note: 43 presentations and talks; **34 talks** were given after Qin joined Auburn University in July 2007)

1. "Reliability Analysis for an Energy-Aware RAID System," *Proc. the 30th IEEE International Performance Computing and Communications Conference (IPCCC)*, Nov. 2011.
2. "Secure Fragment Allocation in a Distributed Storage System with Heterogeneous Vulnerabilities," *Proc. the 6th IEEE International Conference on Networking, Architecture, and Storage (NAS)*, July 28, 2011.
3. "Energy-Efficient High-Performance Storage Systems," Lecture at the Summer School on High-Performance Computing, Hunan University, Changsha, Hunan, China, July 21-23, 2011.
4. "Energy-Efficient Prefetching and Parallel File Systems," Seminar talk at Nanjing University, Nanjing, Jiangsu, China, June 27, 2011.
5. "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.
6. "Energy-Efficient High-Performance Clusters," Seminar talk at Hunan University, Changsha, Hunan, China, June 22, 2011.
7. "Energy-Efficient Parallel Storage Systems with Write-Buffer Disks," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, June 17, 2011.
8. "Energy-Efficient Parallel Storage Systems with Write-Buffer Disks," Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 10, 2011.
9. "How to Write Research Papers," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, June 3, 2011.
10. "Energy-efficient prefetching for high-performance storage systems," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China. June 2, 2011.
11. "An Application-Oriented Approach for Computer Security Education," invited talk at the

- Information Security and Computer Applications Conference, Feb. 25, 2011.
12. "A Novel Application-Oriented Approach to Teaching Computer Security Courses". Poster Session at NSF CCLI/TUES Conference, January 27, 2011.
 13. "Energy Efficient Prefetching – From models to Implementation". Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 2010.
 14. "How to Read Papers?" Training Session for REU students at Auburn University, May 18, 2010.
 15. "How to Succeed in the AU REU Program?" Training Session for REU students at Auburn University, May 17, 2010.
 16. "Improving Energy-Efficiency and Reliability of Storage Systems," Seminar talk at the University of New Orleans, Sept. 4, 2009.
 17. "Can We Improve Energy Efficiency of Secure Disk Systems without Modifying Security Mechanisms?" the IEEE NAS'09 Conference, ZhangJiaJie, China, July 10, 2009.
 18. "Security-Aware Scheduling for Real-Time Parallel Applications on Clusters," Lecture at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 22, 2009.
 19. "How to Read Papers?" Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, June 17, 2009.
 20. "Energy Efficient Scheduling for High-Performance Clusters," Seminar talk at Huazhong University of Science and Technology, Wuhan, Hubei, China. June 8, 2009.
 21. "An Overview of Auburn University," Seminar talk at Nanjing University of Information Science and Technology, Nanjing, China, June 3, 2009.
 22. "Thinking About Going to Graduate School?" Seminar talk at Nanjing University of Information Science and Technology, Nanjing, China, June 3, 2009.
 23. "How to Write Research Papers, Part 1 – General Principles," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China, May 27, 2009.
 24. "Energy Efficient Scheduling for High-Performance Clusters," Seminar talk at Taiyuan University of Science and Technology, Taiyuan, Shanxi, China. May 26, 2009.
 25. "Energy Efficient Resource Management for High-Performance Computing Platforms," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, May 15, 2009.
 26. "How to Write Research Papers, Part 1 – General Principles," Seminar talk at Wuhan National Laboratory for Optoelectronics, Wuhan, China, May 12, 2009.
 27. "DARAW: A New Write Buffer to Improve Parallel I/O Energy-Efficiency," *the 24th Annual ACM Symposium on Applied Computing*, Hawaii, March 2009.
 28. "Why Major in Computer Science and Software Engineering?", Samuel Ginn College of Engineering, Auburn University, Feb. 2009.
 29. "PARM: A Power-Aware Message Scheduling Algorithm for Real-Time Wireless Networks," Poster Presentation at Oak Ridge National Laboratory, Oct. 2008.
 30. "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.
 31. "Enhancing Security of Parallel Applications," Columbus State University, Feb. 2008.
 32. "Security-Aware Scheduling for Clusters," University of Southern Mississippi, Oct. 2007.
 33. "Security-Aware High Performance Cluster Systems," Tutorial, Int'l Conf. Cluster Computing, Sept., 2007.
 34. "Design and Performance Analysis of Energy-Efficient Parallel Storage Systems," *Commodity Cluster Symposium 2007 (CCS)*, Annapolis, Maryland, July 2007.
 35. "Security-Aware Scheduling for Real-Time Systems," Wuhan University of Technology, China, May 2006.
 36. "Security-Aware Real-Time Scheduling," Huazhong University of Science and Technology, China, June 2006.
 37. "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.
 38. "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.
 39. "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.
40. "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.
 41. "Real-time Fault-tolerant Scheduling in Heterogeneous Distributed Systems", *Wuhan University of Technology, China*, Jan. 2003.
 42. "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.
 43. "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-Present)
- 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-Present)

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 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 a topic to be arranged with the instructor.

- 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 8 Ph.D. student, 5 M.S. students (2 with thesis and 3 with projects). Currently, I am supervising 7 Ph.D. students. 2 Ph.D. students have passed their proposal defense and are expected to graduate in Summer 2012. 5 doctoral students graduated from Auburn University in 2008, 2009, 2010, and 2011; 3 doctoral students graduated from New Mexico Tech in 2006, 2007, and 2008, respectively.

In addition, I have served on the committees for 12 Ph.D. students, 22 M.S. students, and 4 undergraduate students.

3.3.1 Ph.D. Dissertations

- Jiong Xie [Ph.D., Dec. 2011; Auburn University]

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 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]
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

- Shu Yin [Ph.D. Candidate, Spring 2012 Expected; Auburn University]

Dissertation: Reliability Models for Energy-Efficient Disk Systems.

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.

- Yun Tian [Ph.D. Student, Spring 2013 Expected; Auburn University]

Dissertation Research: 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.

- Ji Zhang [Ph.D. Student, Spring 2014 Expected; Auburn University]

Dissertation Research: Data-Intensive Computation Offloading.

This project provides the first parallel disk system where large parts of data and I/O processing are offloaded to multicore processors embedded in disk drives. The computation offloading technology is employed to improve parallel disk I/O bandwidth by greatly reducing data movement between disk subsystems and computing hosts. 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 to scale up to arbitrary size.

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

- N/A

3.3.4 M.S. Theses and Projects

- 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 (7 from Auburn University; 3 from New Mexico Tech)

- Joshua Lewis [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 [REU Student; Auburn University]
 Research Topic: A Development Framework for Security-Sensitive Applications.
- Andrew Pitchford [REU Student; Auburn University]

Research Topic: Secure Banking Systems.

- John Barton [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] (Now: Ph.D. Student, 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 Service

3.4.1 Ph.D. (proposal and/or dissertation defense of 15 doctoral students)

Auburn University

- Jian Fang [Advisor: Dr. Lim, Spring 2013]
- David Last [Advisor: Dr. Chwan-Hwa Wu, Summer 2012]
- Tong Liu [Advisor: Dr. Agrawal, Dec. 2011]
- Yuehai Jin [Advisor: Dr. Dai, Dec. 2011]
- Jianjun Yu [Advisor: Dr. Dai, Dec. 2011]
- Heiquan Chen [Advisor: Dr. Ku, Summer 2011]
- Qing Yang [Advisor: Dr. Lim, Spring 2011]
- In Keun Son [Advisor: Dr. Mao, October 2010]
- Kehao Zhang [Advisor: Dr. Lim, August 2010]
- Fangyang Shen [Advisor: Dr. Sun, July 2008]

New Mexico Institute of Mining and Technology

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

3.4.2 M.S. (23 students)

Auburn University

- James Mccracken [Advisor: Dr. Lim, May. 2012]
- Steven "Andy" Hanna [Advisor: Dr. Hamilton, Dec. 2011]
- Sriharsha Banavara [Advisor: Dr. Hamilton, Dec. 2010]
- Kazuya Sakai [Advisor: Dr. Ku, May 2010]
- ArunKumar Jayakeerthy [Advisor: Dr. Lim, Nov. 2008]
- Kyoung Min Kim [Advisor: Dr. Sun, July 2008]
- Shuang Li [Advisor: Dr. Lim, July 2008]
- Cong Liu [Advisor: Dr. Baskiyar, June 2008]
- Jonathan Macdonald [Advisor: Dr. Hamilton, May 2008]
- Derek T. Sanders [Advisor: Dr. Hamilton, April 2008]
- Cong Liu [Advisor: Dr. Baskiyar, Dec. 2007]

New Mexico Institute of Mining and Technology

- Jason Mattax [Advisor: Dr. Liebrock, Fall 2007]
- Ashwin Tamilarasan [Advisor: Dr. Sung, May 2007]

- Ramya Moturi [Advisor: Dr. Sung, May 2007]
- Madhu K. ShankarPani [Advisor: Dr. Sung, May 2007]
- Divya Suryakumar [Advisor: Dr. Sung, May 2007]
- Rajani Goteti [Advisor: Dr. Sung, Dec. 2006]
- Rejeev Veeraghattam [Advisor: Dr. Sung, May 2006]
- Senthil Rajan [Advisor: Dr. Sung, May 2006]
- William Claycomb [Advisor: Dr. Shin, Dec. 2005]
- Jianyun Xu [Advisor: Dr. Sung, Dec. 2005]
- Wei Xu [Advisor: Dr. Sung, Dec. 2005]
- Wieland Feierabend [Advisor: Dr. Mazumdar, Dec. 2005]
- Carlisle House [Advisor: Dr. Liebrock, July 2005]

4. Service

4.1 University and Departmental Service

Auburn University

- 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 Co-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), 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 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 2012), 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 2011), 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
- IEEE Transactions on Parallel and Distributed Systems
- 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

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