

Curriculum Vitae for Zhen Xiao

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Research Interests

My research interests span several areas of distributed systems, including network and system virtualization, cloud computing, fault-tolerant computing, security and dependability.

Education

- Ph.D. in Computer Science, January 2001, Cornell University.
Dissertation: Efficient Error Recovery for Reliable Multicast
Advisor: Kenneth P. Birman
GPA: 4.12/4.00 (A+ = 4.3, A = 4.0, A- = 3.7)
- M.S. in Computer Science, May 1999, Cornell University.
- B.S. in Computer Science, July 1996, Peking University, P.R. China.

Awards and Honors

- **Best Paper Award:** the 17th International workshop on Network and Operating Systems Support for Digital Audio & Video (NOSSDAV'07), June 2007.
- **Best Student Paper Award:** the 13th International World Wide Web Conference (WWW'04), May 2004.
- **Research Excellence Award:** AT&T Labs – Research, November 2002.

Employment

- February 2008 – now: Professor, School of Electronics Engineering and Computer Science, Peking University. Working on virtualization and cloud computing.
- March 2006 – February 2008: Research Staff Member. IBM T.J. Watson Research Center, Hawthorne, NY. Worked on network system software.
- January 2001 – March 2006: Senior Technical Staff Member. AT&T Labs – Research, Florham Park, NJ. Worked on distributed systems research.
- August 1996 – December 2000: Research/Teaching assistant. Cornell University, Ithaca, NY. Worked on fault-tolerant computing.

Professional Activities

- **Program Committees**
 1. The International Conference on Dependable Systems and Networks (DSN): 2010 and 2011
 2. The 17th International World Wide Web Conference (WWW): 2005, 2008, 2009, and 2011
 3. The 24th International Conference on Distributed Computing Systems (ICDCS): 2004, 2007(Vice Chair), 2009, and 2011
 4. The 2006 International Wireless Communications and Mobile Computing Conference (IWCMC'06)
 5. The 2005 International Conference on Parallel Processing (ICPP-05)

6. IEEE Infocom 2005
 7. The 10th International Conference on Parallel and Distributed Systems (ICPADS 2004)
 8. The 8th International Workshop on Web Content Caching and Distribution (WCW 2003)
- IEEE Senior Member
 - Vice Chair for the International Conference on Distributed Computing Systems (ICDCS'07), Internet Computing and Applications track.
 - Program co-chair for Internet Protocol TV workshop, jointly held with the 15th International World Wide Web Conference (WWW'06)
 - Served on various NSF panels in the U.S.
 - Panel Moderator for the 8th International Workshop on Web Content Caching and Distribution (WCW 2003): *Caching the Uncachable: An Uphill Battle Against Dynamic and Personalized Content*

Journal/Book Publications

The following publications can be downloaded from <http://zhenxiao.com/papers>

- Jun Zhu, Zhefu Jiang, Zhen Xiao, and Xiaoming Li. "Optimizing the Performance of Virtual Machine Synchronization for Fault Tolerance", To appear in *IEEE Transactions on Computers*, 2011.
- Zhen Xiao. "Cloud computing and virtualization (in Chinese)", *Communications of CCF (China Computer Federation)*, October 2009.
- Yih-Farn Chen, Yennun Huang, Rittwik Jana, Hongbo Jiang, Michael Rabinovich, Bin Wei, and Zhen Xiao. "Towards Capacity and Profit Optimization of Video-on-Demand Services in a Peer-Assisted IPTV Platform", *Multimedia Systems Journal*, Springer Berlin, Volume 15, Number 1, pages 1-15, February 2009.
- Lei Guo, Songqing Chen, Zhen Xiao, Enhua Tan, Xiaoning Ding, and Xiaodong Zhang. "A Performance Study of BitTorrent-like Peer-to-Peer Systems", *IEEE Journal on Selected Areas in Communication (JSAC), Special Issue on Peer-to-Peer Communications and Applications*, Vol 25, No. 1, January 2007.
- Yennun Huang, Yih-Farn Chen, Rittwik Jana, Hongbo Jiang, Michael Rabinovich, Amy Reibman, Bin Wei, and Zhen Xiao. "Capacity Analysis of MediaGrid: a P2P IPTV Platform for Fiber to the Node (FTTN) Networks", *IEEE Journal on Selected Areas in Communication (JSAC), Special Issue on Peer-to-Peer Communications and Applications*, Vol 25, No. 1, January 2007.
- Leeann Bent, Michael Rabinovich, Geoffrey M. Voelker, and Zhen Xiao. "Characterization of a Large Web Site Population with Implications for Content Delivery", *World Wide Web Journal*, Springer Netherlands, Volume 9, Number 4, pages 505-536, December 2006.
- Claudia Canali, Michael Rabinovich, and Zhen Xiao. "Utility Computing for Internet Applications", Invited book chapter in *Web Content Delivery*, Springer-Verlag, 2005, ISBN:0-387-24356-9.
- Christof Fetzer and Zhen Xiao. "Automatic Testing of Errors and Vulnerabilities in Software Components", Invited book chapter in *Testing Commercial-off-the-shelf Components and Systems*, Springer-Verlag, January 2005.
- Kenneth P. Birman, Mark Hayden, Ozgur Ozkasap, Zhen Xiao, Mihai Budiu, and Yaron Minsky. "Bimodal Multicast", *ACM Transactions on Computer Systems (TOCS)*, May 1999.

Conference/Workshop Publications

The following publications can be downloaded from <http://zhenxiao.com/papers>

- Jun Zhu, Zhefu Jiang, Zhen Xiao. "Twinkle: A Fast Resource Provisioning Mechanism for Internet Services", To appear in *Proc. of IEEE Infocom*, April 2011.

- Jun Zhu, Wei Dong, Zhefu Jiang, Xiaogang Shi, Zhen Xiao, and Xiaoming Li. “Improving the Performance of Hypervisor-Based Fault Tolerance”, *Proc. of the International Parallel and Distributed Processing Symposium (IPDPS 2010)*, April 2010.
- Zhi Yang, Yafei Dai, and Zhen Xiao. “Exploring the Cost-Availability Tradeoff in P2P Storage Systems”, *Proc. of the International Conference on Parallel Processing (ICPP 2009)*, September 2009.
- Lei Guo, Enhua Tan, Songqing Chen, Zhen Xiao, and Xiaodong Zhang. “The Stretched Exponential Distribution of Internet Media Access Patterns”, *Proc. of the ACM Symposium on Principles of Distributed Computing (PODC 2008)*, August 2008.
- Zhen Xiao and Fan Ye. “New Insights on Internet Streaming and IPTV”, *Proc. of the ACM International Conference on Image and Video Retrieval (CIVR 2008)*, July 2008.
- Guanhua Yan, Zhen Xiao, and Stephan Eidenbenz. “Catching Instant Messaging Worms with Change-Point Detection Techniques”, *Proc. of the USENIX Workshop on Large-Scale Exploits and Emergent Threats (LEET '08)*, April 2008.
- Zhen Xiao, Lei Guo, and John Tracey. “Understanding Instant Messaging Traffic Characteristics”, *Proc. of the 27th International Conference on Distributed Computing Systems (ICDCS'07)*, June 2007.
- Yih-Farn Chen, Yennun Huang, Rittwik Jana, Hongbo Jiang, Michael Rabinovich, Bin Wei, and Zhen Xiao. “When is P2P technology beneficial to IPTV services?” *Proc. of the 17th International workshop on Network and Operating Systems Support for Digital Audio & Video (NOSSDAV'07)*, June 2007. **Best Paper Award**
- Lei Guo, Enhua Tan, Songqing Chen, Zhen Xiao, and Xiaodong Zhang. “Does Internet Media Traffic Really Follow Zipf-like Distribution?” *Proc. of ACM SIGMETRICS (Extended Abstract)*, June 2007.
- Lei Guo, Enhua Tan, Songqing Chen, Zhen Xiao, Oliver Spatscheck, and Xiaodong Zhang. “Delving into Internet Streaming Media Delivery: A Quality and Resource Utilization Perspective”, *Proc. of ACM SIGCOMM Internet Measurement Conference (IMC'06)*, October 2006.
- Yennun Huang, Yih-Farn Chen, Rittwik Jana, Bin Wei, Michael Rabinovich, and Zhen Xiao. “Challenges of P2P Streaming Technologies for IPTV Services”, *Proc. of the International Workshop on Internet Protocol TV Services over World Wide Web*, May 2006.
- Lei Guo, Songqing Chen, Zhen Xiao, Enhua Tan, Xiaoning Ding, and Xiaodong Zhang. “Measurements, Analysis, and Modeling of BitTorrent-like Systems”, *Proc. of ACM SIGCOMM Internet Measurement Conference (IMC'05)*, October 2005.
- Lei Guo, Songqing Chen, Zhen Xiao, and Xiaodong Zhang. “DISC: Dynamic Interleaved Segment Caching for Interactive Streaming”, *Proc. of the 25th International Conference on Distributed Computing Systems (ICDCS'05)*, June 2005.
- Lei Guo, Songqing Chen, Zhen Xiao, and Xiaodong Zhang. “Analysis of Multimedia Workloads with Implications for Internet Streaming”, *Proc. of the 14th International World Wide Web Conference (WWW'05)*, May 2005.
- Leeann Bent, Michael Rabinovich, Geoffrey M. Voelker, and Zhen Xiao. “Towards Informed Web Content Delivery”, *Proc. of the Ninth International Workshop on Web Content Caching and Distribution (WCW'04)*, October 2004.
- Leeann Bent, Michael Rabinovich, Geoffrey M. Voelker, and Zhen Xiao. “Characterization of a Large Web Site Population with Implications for Content Delivery”, *Proc. of the 13th International World Wide Web Conference (WWW'04)*, May 2004. **Best Student Paper Award**
- Michael Rabinovich, Zhen Xiao, and Amit Aggarwal. “Computing on the Edge: A Platform for Replicating Internet Applications”, *Proc. of the Eighth International Workshop on Web Content Caching and Distribution (WCW'03)*, September 2003.
- Christof Fetzer and Zhen Xiao. “HEALERS: A Toolkit for Enhancing the Robustness and Security of Existing Applications”, *Proc. of the International Conference on Dependable Systems and Networks (Practical Experience and Demonstrations) (DSN'03)*, June 2003.

- Michael Rabinovich, Zhen Xiao, Fred Douglis, and Chuck Kalmanek. “Moving Edge Side Includes to the Real Edge – the Clients”, *Proc. of the 4th USENIX Symposium on Internet Technologies and Systems (USITS’03)*, March 2003.
- Jennifer Rexford, Jia Wang, Zhen Xiao, and Yin Zhang. “BGP Routing Stability of Popular Destinations”, *Proc. of ACM SIGCOMM Internet Measurement Workshop (Extended Abstract) (IMW’02)*, November 2002.
- Christof Fetzer and Zhen Xiao. “A Flexible Generator Architecture for Improving Software Dependability”, *Proc. of the 13th International Symposium on Software Reliability Engineering (ISSRE’02)*, November 2002.
- Pradnya Karbhari, Michael Rabinovich, Zhen Xiao, and Fred Douglis. “ACDN: A Content Delivery Network for Applications”, *Proc. of ACM SIGMOD (Project Demo)*, June 2002.
- Christof Fetzer and Zhen Xiao. “An Automated Approach to Increasing the Robustness of C Libraries”, *Proc. of the International Conference on Dependable Systems and Networks (DSN’02)*, June 2002.
- Zhen Xiao, Kenneth P. Birman, and Robbert van Renesse. “Optimizing Buffer Management for Reliable Multicast”, *Proc. of the International Conference on Dependable Systems and Networks (DSN’02)*, June 2002.
- Christof Fetzer and Zhen Xiao. “Detecting Heap Smashing Attacks Through Fault Containment Wrappers”, *Proc. of the 20th IEEE Symposium on Reliable Distributed Systems (SRDS’01)*, October 2001.
- Zhen Xiao and Kenneth P. Birman. “A Randomized Error Recovery Algorithm for Reliable Multicast”, *Proc. of IEEE Infocom*, April 2001.
- Zhen Xiao and Kenneth P. Birman. “Providing Efficient, Robust Error Recovery Through Randomization”, *Proc. of the International Workshop on Applied Reliable Group Communication (Jointly held with the 21st International Conference on Distributed Computing Systems (ICDCS’01))*, April 2001.
- Ozgur Ozkasap, Robbert van Renesse, Kenneth P. Birman, and Zhen Xiao. “Efficient Buffering in Reliable Multicast Protocols”, *Proc. of the International Workshop on Networked Group Communication (NGC’99)*, November 1999.

Patents

1. Christof Fetzer and Zhen Xiao. “Robust Software Library Wrapper Method and Apparatus”. U.S. Patent Number 7,225,428, issued on May 29, 2007.
2. Christof Fetzer and Zhen Xiao. “Methods and Apparatus for Detecting Heap Smashing”. U.S. Patent Number 6,832,302, issued on December 14, 2004.
3. Lei Guo, Erich M. Nahum, John Tracey, Dinesh Verma, Xiping Wang, Charles P. Wright, and Zhen Xiao. “Method and Apparatus for Processing Messages in Messaging System”. U.S. Patent filed on August 2007.
4. Yennun Huang, Yih-Farn Chen, Rittwik Jana, Amy Reibman, Bin Wei, Zhen Xiao, and Michael Rabinovich. “System and Method for Peer to Peer Video Streaming”. U.S. Patent filed on February 2007.
5. Arup Acharya, Erich M. Nahum, John Tracey, Xiping Wang, Charles P. Wright, and Zhen Xiao. “A Method and Apparatus for Fast Classification of SIP Messages”. U.S. Patent filed on August 2006.
6. Claudia Canali, Alexandre Gerber, Stephen Fisher, Michael Rabinovich, Oliver Spatscheck, and Zhen Xiao. “Monitoring For Replica Placement and Request Distribution”. U.S. patent filed on November 30, 2005.
7. Songqing Chen, Xiaoning Ding, Lei Guo, Enhua Tang, Zhen Xiao, and Xiaodong Zhang. “Method and System for Scalable Content Storage and Delivery”. U.S. patent filed September 19, 2005.
8. Songqing Chen, Lei Guo, Zhen Xiao, and Xiaodong Zhang. “Method and System for Hierarchical Streaming Proxies”. U.S. patent filed on September 9, 2005.
9. Christof Fetzer and Zhen Xiao. “Method for Detecting Software Errors and Vulnerabilities”. U.S. patent filed on August 29, 2005.

10. Leeann Bent, Michael Rabinovich, Geoffrey Voelker, and Zhen Xiao. “Method and Apparatus for Prefetching Web Content”. U.S. patent filed in August 10, 2005.
11. Songqing Chen, Lei Guo, Zhen Xiao, and Xiaodong Zhang. “Caching Method and System for Providing Interactive Streaming”. U.S. patent filed on January 31, 2005.
12. Songqing Chen, Lei Guo, Zhen Xiao, and Xiaodong Zhang. “Method and System for Supplying Media over Communication Networks”. U.S. patent filed on January 31, 2005.
13. Chuck Kalmanek, Michael Rabinovich, and Zhen Xiao. “Method for Determining Where Dynamic Contents Should Be Assembled”. U.S. patent filed on December 29, 2003.
14. Christof Fetzer and Zhen Xiao. “Robust Software Library Wrapper Method and Apparatus”. U.S. patent filed on May 20, 2003.
15. Fred Douglass, Michael Rabinovich, and Zhen Xiao. “Method for Client-Side Inclusion of Data Elements”. U.S. patent filed on March 22, 2002.

Conference and Colloquium Presentations

Slides for the following talks can be downloaded from <http://zhenxiao.com/talks>

1. “Gone with the cloud: Adaptive Resource Virtualization for Amazon EC2-like Environment”, System Research Seminar, Department of Computer Science, Cornell University, November 2009.
2. “Understanding Instant Messaging Traffic Characteristics”, the 27th International Conference on Distributed Computing Systems (ICDCS’07), Toronto, Canada, June 2007.
3. “Delving into Internet Streaming Media Delivery: A Quality and Resource Utilization Perspective”, Invited Talk, AT&T Labs – Research, Feb 2007.
4. “Understanding Web content delivery performance: Why is the Web still slow and what can we do about it?”, Invited Talk, Department of Computer Science, University of California at Berkeley, October 2005.
5. “Optimizing Internet Content Delivery Systems – A View from the Inside”, Invited Talk, Department of Computer Science, University of Tsukuba, Japan, May 2005.
6. “Analysis of Multimedia Workloads with Implications for Internet Streaming”, the 14th International World Wide Web Conference (WWW’05), Chiba, Japan, May 2005.
7. “An Automated Approach to Software Reliability and Security”, Invited Talk, Department of Computer Science, University of California at Berkeley, June 2003.
8. “HEALERS: A Toolkit for Enhancing the Robustness and Security of Existing Applications”, IEEE International Conference on Dependable Systems and Networks (DSN’03), San Francisco, California, June 2003.
9. “Moving Edge Side Includes to the Real Edge – the Clients”, USENIX Symposium on Internet Technologies and Systems (USITS’03), Seattle, Washington, March 2003.
10. “Client-Side Includes: Faster Access to Dynamic Web Content”, AT&T Innovation Forum, Middletown, New Jersey, October 2002.
11. “Optimizing Buffer Management for Reliable Multicast”, IEEE International Conference on Dependable Systems and Networks (DSN’02), Bethesda, Maryland, June 2002.
12. “ACDN: A Content Delivery Network for Applications”, ACM SIGMOD, Madison, Wisconsin, June 2002.
13. “A Randomized Error Recovery Algorithm for Reliable Multicast”, IEEE Infocom, Anchorage, Alaska, April 2001.
14. “Providing Efficient, Robust Error Recovery Through Randomization”, IEEE International Workshop on Applied Reliable Group Communication, Phoenix, Arizona, April 2001.