

# Shan Lu

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**Perm. Residency:**  
United States  
**Gender:** Female

## RESEARCH INTERESTS

Software systems, software reliability, multi-threaded software

## EDUCATION

- Aug. 2003 – Dec. 2008      **University of Illinois at Urbana-Champaign, Urbana, IL**  
Ph.D. in Computer Science (2008)  
Advisor: Prof. Yuanyuan Zhou.  
Thesis: Understanding, Detecting, and Exposing Concurrency Bugs.
- Sep. 1998 – Jul. 2003      **University of Science & Technology of China, Hefei, China**  
B.S. in Computer Science.

## WORK EXPERIENCE

- Jan. 2009–present      **Assistant Professor**  
University of Wisconsin, Madison

## AWARDS

- 2011      ACM SIGPLAN CACM Research Highlights Nomination.  
“Automated Atomicity-Violation Fixing (PLDI’11)”
- 2011–2016      NSF Career Award.
- 2009–2014      Clare Boothe Luce Assistant Professor.
- 2007      W. J. Poppelbaum Memorial Award, University of Illinois.
- 2006      IEEE Micro Top Picks in Computer Architecture.  
“AVIO: Detecting Atomicity Violations via Access-Interleaving Invariants (ASPLOS’06)”

## SYSTEMS RELEASED

- BugBench      A benchmark for software bug detection.  
Released to more than 60 research groups.
- AVIO      A concurrency bug detection tool.  
Licensed to *Intel*.

## GRANTS

- 08/01/2010 – 07/31/2013      Fighting Concurrency Bugs through Effect-Oriented Approaches, PI: Shan Lu, NSF CCF-1018180, Award amount: \$469,488.
- 06/01/2011 – 05/31/2016      Combating Performance Bugs in Software Systems, PI: Shan Lu, NSF CCF-1054616, Award amount: \$449,680.

## Professional Activities

Program Committee Member	OSDI 2012, 2010; RV 2012; USENIX 2010; HotPar 2012; PASTE 2011; HotDep 2009; SOSP WIP/Poster 2009
External Reviewer	MICRO 2011, ASPLOS 2010, ISCA 2009, DSN 2009, DSN 2008, PLDI 2008, Micro 2007, ISSTA 2007
Conference Organizing	Chair for 2011 ACM Student Research Competition at ICS Chair for 2011 ICS Poster session Chair for 2010 USENIX Annual Technical Conference Poster/WIP

## PUBLICATIONS

### REFEREED JOURNAL ARTICLES

1. Wei Zhang, Chong Sun, Junghee Lim, **Shan Lu**, and Thomas Reps, “ConMem: Detecting Crash-Triggering Concurrency Bugs through an Effect-Oriented Approach”, *ACM Transactions on Software Engineering and Methodology (ACM-TOSEM)*, 2012.
2. **Shan Lu**, Soyeon Park, and Yuanyuan Zhou, “Detecting Concurrency Bugs From the Perspectives of Synchronization Intentions”, *IEEE Transactions on Parallel and Distributed Systems (IEEE-TPDS)*, 2011.
3. **Shan Lu**, Soyeon Park, and Yuanyuan Zhou, “Finding Atomicity-Violation Bugs Through Unserializable Interleaving Testing”, *IEEE Transactions on Software Engineering (IEEE-TSE)*, April 2011.
4. **Shan Lu**, Joe Tucek, Feng Qin, and Yuanyuan Zhou, “AVIO: Detecting Atomicity Violations via Access-Interleaving Invariants”, *IEEE Micro Special Issue: Top Picks from Computer Architecture Conferences*, January-February 2007 Issue.
5. Zhenmin Li, **Shan Lu**, Suvda Myagmar and Yuanyuan Zhou, “CP-Miner: finding copy-paste and related bugs in large-scale software code”, *IEEE Transactions on Software Engineering (IEEE-TSE)*, April 2006.

### REFEREED CONFERENCE PAPERS

6. Guoliang Jin, Linhai Song, Xiaoming Shi, Joel Scherpelz, and **Shan Lu**, “Understanding and Detecting Real-World Performance Bugs”, *Programming Language Design and Implementation (PLDI’12)*, June 2012.
7. Haris Volos, Andres Jaan Tack, Michael Swift, **Shan Lu** “Applying Transactional Memory to Concurrency Bugs”, *17th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XVII)*, March 2012.
8. Guoliang Jin, Linhai Song, Wei Zhang, **Shan Lu**, Ben Liblit, “Automated Atomicity-Violation Fixing”, *Programming Language Design and Implementation (PLDI’11)*, June 2011 (won **SIGPLAN CACM Research Highlights Nominations**).
9. Wei Zhang, Junghee Lim, Ramya Olichandran, Joel Scherpelz, Guoliang Jin, **Shan Lu**, Thomas Reps, “ConSeq: Detecting Concurrency Bugs through Sequential Errors”, *16th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XVI)*, March 2011.
10. Guoliang Jin, Aditya Thakur, Ben Liblit, **Shan Lu**, “Instrumentation and Sampling Strategies for Cooperative Concurrency Bug Isolation”, *International Conference on Object-Oriented Programming, Systems, Languages & Applications (OOPSLA)*, October 2010.
11. Yao Shi, Soyeon Park, Zuoning Yin, **Shan Lu**, Yuanyuan Zhou, Wenguang Chen, Weimin Zheng, “Do I Use the Wrong Definition? DefUse: Definition-Use Invariants for Detecting Concurrency and Sequential Bugs.”, *International Conference on Object-Oriented Programming, Systems, Languages & Applications (OOPSLA)*, October 2010.

## PUBLICATIONS (continued)

12. Yadi Ma, Suman Banerjee, **Shan Lu**, Cristian Estan, “Leveraging Parallelism for Multi-dimensional Packet Classification on Software Routers”, *ACM SIGMETRICS 2010 International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS)*, June 2010.
13. Wei Zhang, Chong Sun, **Shan Lu**, “ConMem: Detecting Severe Concurrency Bugs through an Effect-Oriented Approach”, *15th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XV)*, March 2010.
14. Soyeon Park, Weiwei Xiong, Zuoning Yin, Rini Kaushik, Kyu H. Lee, **Shan Lu**, Yuanyuan Zhou, “Do You Have to Reproduce the Bug at the First Replay Attempt? – PRES: Probabilistic Replay with Execution Sketching on Multiprocessors”, *22nd ACM Symposium on Operating Systems Principles (SOSP’09)*, October 2009.
15. Soyeon Park, **Shan Lu**, Yuanyuan Zhou, “CTrigger: Exposing Atomicity Violation Bugs from Their Hiding Places”, *14th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XIV)*, March 2009.
16. **Shan Lu**, Soyeon Park, Eunsoo Seo, Yuanyuan Zhou, “Learning from mistakes — a comprehensive study of real world concurrency bug characteristics”, *13th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XIII)*, March 2008.
17. **Shan Lu**, Soyeon Park, Chongfeng Hu, Xiao Ma, Weihang Jiang, Zhenmin Li, Raluca Popa, Yuanyuan Zhou, “MUVI: Automatically Inferring Multi-Variable Access Correlations and Detecting Related Semantic and Concurrency Bugs”, *21st ACM Symposium on Operating Systems Principles (SOSP’07)*, October 2007.
18. Joseph Tucek, **Shan Lu**, Chengdu Huang, Spiros Xanthos, and Yuanyuan Zhou, “Triage: Diagnosing Production Run Failures at the User’s Site”, *21st ACM Symposium on Operating Systems Principles (SOSP’07)*, October 2007.
19. **Shan Lu**, Weihang Jiang and Yuanyuan Zhou, “A Study of Interleaving Coverage Criteria”, *15th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE’07)* (short paper), September 2007.
20. Joseph Tucek, James Newsome, **Shan Lu**, Chengdu Huang, Spiros Xanthos, David Brumley, Yuanyuan Zhou and Dawn Song, “Sweeper: A Lightweight End-to-end System for Defending Against Fast Worms”, *2nd ACM SIGOPS EuroSys (EuroSys’07)*, March 2007.
21. **Shan Lu**, Pin Zhou, Wei Liu, Yuanyuan Zhou, Josep Torrellas, “PathExpander: Architectural Support for Increasing the Path Coverage of Dynamic Bug Detection”, *39th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO-39)*, December 2006.
22. **Shan Lu**, Joe Tucek, Feng Qin, and Yuanyuan Zhou, “AVIO: Detecting Atomicity Violations via Access-Interleaving Invariants”, *12th International Conference on Architecture Support for Programming Languages and Operating Systems (ASPLOS-XII)*, October 2006 (won **IEEE Micro Top Picks Award**).
23. Chad Verbowski, Emre Kiciman, Arunvijay Kumar, and Brad Daniels, **Shan Lu**, Juhan Lee, Yi-Min Wang, Roussi Roussev. “Flight Data Recorder: Monitoring Persistent-State Interactions to Improve Systems Management”, *7th Symposium on Operating System Design and Implementation (OSDI’06)*, November 2006.
24. Chad Verbowski, Brad Daniels, Emre Kiciman, **Shan Lu**, Roussi Roussev, Yi-Min Wang and Juhan Lee. “Analyzing Persistent State Interactions to Improve State Management”, *Joint International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS/Performance’06)* (short paper), June 2006.
25. Feng Qin, **Shan Lu** and Yuanyuan Zhou, “SafeMem: Exploiting ECC-Memory for Detecting Memory Leaks and Memory Corruption During Production Runs”, *10th International Symposium on High-Performance Computer Architecture (HPCA’05)*, February 2005.

## PUBLICATIONS (continued)

26. Zhenmin Li, **Shan Lu**, Suvda Myagmar and Yuanyuan Zhou, “CP-Miner: A Tool for Finding Copy-paste and Related Bugs in Operating System Code”, *6th Symposium on Operating System Design and Implementation (OSDI’04)*, December 2004.
27. Pin Zhou, Wei Liu, Long Fei, **Shan Lu**, Feng Qin, Yuanyuan Zhou, Samuel Midkiff and Josep Torrellas, “AccMon: Automatically Detecting Memory-related Bugs via Program Counter-based Invariants”, *37th Annual IEEE/ACM International Symposium on Micro-architecture (MICRO-37)*, December 2004.
28. Keman Yu, **Shan Lu**, Jiang Li and Shipeng Li, “Half-pixel Motion Estimation Bypass Based on a Linear Model”, *24th Picture Coding Symposium (PCS’04)*, December 2004.
29. **Shan Lu**, Keman Yu, Jiang Li and Shipeng Li, “A Low Complexity 2-Power Transform for Video Compression”, *4th International Conference on Information, Communications & Signal Processing (ICICS’03)*, December 2003.

## REFEREED WORKSHOP PAPERS

30. Joel Scherpelz, and **Shan Lu**, “Lessons from performance bugs for performance evaluation”, *Workshop on Experimental Evaluation of Software and Systems in Computer Science*, October 2010.
31. Aditya Thakur, Rathijit Sen, Ben Liblit, and **Shan Lu**, “Cooperative Crug Isolation”, *7th International Workshop on Dynamic Analysis (WODA’09)*, July 2009.
32. Joseph Tucek, **Shan Lu**, Chengdu Huang, Spiros Xanthos, Yuanyuan Zhou, “Automatic Online Failure Diagnosis at the End-User Site”, *2nd Workshop on Hot Topics in System Dependability (HotDep ’06)*, November 2006.
33. Zhenmin Li, Lin Tan, Xuanhui Wang, **Shan Lu**, Yuanyuan Zhou and Chengxiang Zhai, “Have Things Changed Now? – An Empirical Study of Bug Characteristics in Modern Open Source Software”, *1st Workshop on Architectural and System Support for Improving Software Dependability (ASID)* held together with *International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, October 2006.
34. **Shan Lu**, Zhenmin Li, Feng Qin, Lin Tan, Pin Zhou and Yuanyuan Zhou, “BugBench: A Benchmark for Evaluating Bug Detection Tools”, *Workshop on the Evaluation of Software Defect Detection Tools (Bug 2005)*, June 2005.