

Guoliang Jin

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Research Interests Software systems reliability, focusing on concurrency issues and performance issues in database-backed web applications, multi-threaded software, and cloud systems.

Employment Assistant Professor, January 2015 – present
Department of Computer Science, North Carolina State University

Education University of Wisconsin–Madison, Madison, WI
Ph.D. in Computer Sciences, 2014
Thesis: Diagnosing and Fixing Concurrency Bugs (Advisor: Prof. Shan Lu)

University of Science and Technology of China, Hefei, Anhui, China
B.E. in Computer Science and Technology, 2007

Selected Honors and Awards

- The Most Receptive Undergraduate Professor Outside of Class by the ACM / AITP student organization at NC State, 2020.
- SIGPLAN Research Highlights for the paper “Automated Atomicity-Violation Fixing” published in PLDI 2011.
- The 26th Guo Moruo Scholarship, University of Science and Technology of China, 2007.

Publications (Names of my students and mine are highlighted)

1. **Qi Zhao, Zhengyi Qiu, Shudi Shao**, Xinning Hui, **Hassan Ali Khan**, and **Guoliang Jin**. “Understanding and Reaching the Performance Limit of Schedule Tuning on Stable Synchronization Determinism”. In *Proceedings of the 31st International Conference on Parallel Architectures and Compilation Techniques*, PACT ’22, page 223–238. February 2022. ACM
2. **Zhengyi Qiu, Shudi Shao, Qi Zhao, Hassan Ali Khan**, Xinning Hui, and **Guoliang Jin**. “A Deep Study of the Effects and Fixes of Server-Side Request Races in Web Applications”. In *Proceedings of the 19th International Conference on Mining Software Repositories*, MSR ’22, page 744–756. May 2022. ACM
3. **Hassan Ali Khan**, Hassan Iqbal, Muhammad Shahzad, and **Guoliang Jin**. “RMS: Removing Barriers to Analyze the Availability and Surge Pricing of Ridesharing Services”. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, CHI ’22. April 2022. ACM
4. **Zhengyi Qiu, Shudi Shao, Qi Zhao**, and **Guoliang Jin**. “A Characteristic Study of Deadlocks in Database-Backed Web Applications”. In *2021 IEEE 32nd International Symposium on Software Reliability Engineering*, ISSRE ’21, pages 510–521. October 2021. IEEE
5. **Zhengyi Qiu, Shudi Shao, Qi Zhao**, and **Guoliang Jin**. “Understanding and Detecting Server-Side Request Races in Web Applications”. In *Proceedings of the 29th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ESEC/FSE 2021, page 842–854. August 2021. ACM
6. Jingzhu He, Ting Dai, Xiaohui Gu, and **Guoliang Jin**. “HangFix: Automatically Fixing Software Hang Bugs for Production Cloud Systems”. In *Proceedings of the 11th ACM Symposium on Cloud Computing*, SoCC ’20, page 344–357. October 2020. ACM
7. **Tao Wang, Xiao Yu, Zhengyi Qiu, Guoliang Jin**, and Frank Mueller. “BARRIERFINDER: Recognizing Ad Hoc Barriers”. *Empirical Software Engineering*, 25:4676–4706, November 2020, Springer

8. **Shudi Shao, Zhengyi Qiu, Xiao Yu, Wei Yang, Guoliang Jin, Tao Xie, and Xintao Wu.** “Database-Access Performance Antipatterns in Database-Backed Web Applications”. In *2020 IEEE International Conference on Software Maintenance and Evolution, ICSME '20*, pages 58–69. October 2020. IEEE
9. **Tao Wang, Xiao Yu, Zhengyi Qiu, Guoliang Jin, and Frank Mueller.** “BARRIERFINDER: Recognizing Ad Hoc Barriers”. In *2019 IEEE International Conference on Software Maintenance and Evolution, ICSME '19*, pages 323–327. September 2019. IEEE
10. **Qi Zhao, Zhengyi Qiu, and Guoliang Jin.** “Semantics-aware Scheduling Policies for Synchronization Determinism”. In *Proceedings of the 24th Symposium on Principles and Practice of Parallel Programming, PPOPP '19*, page 242–256. February 2019. ACM
11. **Xiao Yu and Guoliang Jin.** “Dataflow Tunneling: Mining Inter-request Data Dependencies for Request-based Applications”. In *Proceedings of the 40th International Conference on Software Engineering, ICSE '18*, page 586–597. May 2018. ACM
12. **Xiao Yu, Pallavi Joshi, Jianwu Xu, Guoliang Jin, Hui Zhang, and Guofei Jiang.** “Cloud-Seer: Workflow Monitoring of Cloud Infrastructures via Interleaved Logs”. In *Proceedings of the Twenty-First International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS '16*, page 489–502. April 2016. ACM
13. **Rui Gu, Guoliang Jin, Linhai Song, Linjie Zhu, and Shan Lu.** “What Change History Tells Us About Thread Synchronization”. In *Proceedings of the 2015 10th Joint Meeting on Foundations of Software Engineering, ESEC/FSE '15*, page 426–438. September 2015. ACM
14. **Daniel J. Dean, Peipei Wang, Xiaohui Gu, William Enck, and Guoliang Jin.** “Automatic Server Hang Bug Diagnosis: Feasible Reality or Pipe Dream?”. In *Proceedings of the 2015 IEEE International Conference on Autonomic Computing, ICAC '15*, pages 127–132. July 2015. IEEE
15. **Dongdong Deng, Guoliang Jin, Marc de Kruijf, Ang Li, Ben Liblit, Shan Lu, Shanxiang Qi, Jinglei Ren, Karthikeyan Sankaralingam, Linhai Song, Yongwei Wu, Mingxing Zhang, Wei Zhang, and Weimin Zheng.** “Fixing, preventing, and recovering from concurrency bugs”. *Science China Information Sciences*, 58(5):1–18, May 2015, Springer
16. **Joy Arulraj, Guoliang Jin, and Shan Lu.** “Leveraging the Short-Term Memory of Hardware to Diagnose Production-Run Software Failures”. In *Proceedings of the 19th International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS '14*, pages 207–222. March 2014. ACM
17. **Bill Harris, Guoliang Jin, Shan Lu, and Somesh Jha.** “Validating Library Usage Interactively”. In *Proceedings of the 25th international conference on Computer Aided Verification, CAV '13*, pages 796–812. July 2013. Springer
18. **Joy Arulraj, Po-Chun Chang, Guoliang Jin, and Shan Lu.** “Production-Run Software Failure Diagnosis via Hardware Performance Counters”. In *Proceedings of the 18th International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS '13*, pages 101–112. March 2013. ACM
19. **Guoliang Jin, Wei Zhang, Dongdong Deng, Ben Liblit, and Shan Lu.** “Automated Concurrency-Bug Fixing”. In *Proceedings of the 10th USENIX Conference on Operating Systems Design and Implementation, OSDI '12*, pages 221–236. October 2012. USENIX Association
20. **Guoliang Jin, Linhai Song, Xiaoming Shi, Joel Scherpelz, and Shan Lu.** “Understanding and Detecting Real-World Performance Bugs”. In *Proceedings of the 33rd ACM SIGPLAN Conference on Programming Language Design and Implementation, PLDI '12*, pages 77–88. June 2012. ACM
21. **Guoliang Jin, Linhai Song, Wei Zhang, Shan Lu, and Ben Liblit.** “Automated Atomicity-Violation Fixing”. In *Proceedings of the 32nd ACM SIGPLAN Conference on Programming Language Design and Implementation, PLDI '11*, pages 389–400. June 2011. ACM

22. Wei Zhang, Junghee Lim, Ramya Olichandran, Joel Scherpelz, **Guoliang Jin**, Shan Lu, and Thomas Reps. “ConSeq: Detecting Concurrency Bugs through Sequential Errors”. In *Proceedings of the 16th International Conference on Architectural Support for Programming Languages and Operating Systems*, ASPLOS ’11, pages 251–264. March 2011. ACM
23. **Guoliang Jin**, Aditya Thakur, Ben Liblit, and Shan Lu. “Instrumentation and Sampling Strategies for Cooperative Concurrency Bug Isolation”. In *Proceedings of the ACM International Conference on Object Oriented Programming Systems Languages and Applications*, OOPSLA ’10, pages 241–255. October 2010. ACM

**Ph.D.
Students**

- Xiao Yu, graduated in Summer 2018, first employment as a researcher at NEC Laboratories America, now at Stellar Cyber.
- Tao Wang, co-advised with Frank Mueller, graduated in Fall 2019, now a Postdoctoral Researcher at Stanford University.
- Currently advising: Zhengyi Qiu (passed the Oral Prelim Exam), Hassan Ali Khan (passed the Oral Prelim Exam, co-advising with Muhammad Shahzad), Qi Zhao (passed the Oral Prelim Exam), and Shudi Shao (passed the Oral Prelim Exam).

Teaching

- CSC 246 Concepts and Facilities of Operating Systems, Fall 2016, Fall 2017, Spring 2019, Spring 2020, Fall 2020, Spring 2023
- CSC 501 Operating Systems Principles, Spring 2015, Fall 2015, Fall 2017, Fall 2018, Fall 2019, Fall 2020, Fall 2021, Fall 2022
- CSC 591/791 Reliable Software Systems, Spring 2016, Spring 2017, Spring 2018, Spring 2022

**Professional
Services**

- External review committee member for the 27th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’22).
- Program committee member for the 27th Symposium on Principles and Practice of Parallel Programming (PPoPP ’22).
- Workshop co-chair for the 40th IEEE International Performance Computing and Communications Conference (IPCCC ’21).
- Program committee member for 2021 International Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES ’21).
- Program committee member for the 25th Symposium on Principles and Practice of Parallel Programming (PPoPP ’20).
- External review committee member for the 25th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’20).
- Program committee member for the 2019 International Symposium on Advanced Parallel Processing Technology (APPT ’19).
- External review committee member for the 24th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’19).
- Local arrangements co-chair for 2018 IEEE International Symposium on Workload Characterization (IISWC ’18).
- Finance chair for the 23rd ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’18).
- Publicity chair for the 22nd ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’17).
- Program committee member for Symposium on Operating Systems Principles Student Research Competition 2017 (SOSP ’17 SRC).
- Program committee member for the 15th Asian Symposium on Programming Languages and Systems (APLAS ’17).

- Program committee member for the 11th International Conference on Advanced Parallel Processing Technology (APPT '15).
- Sub reviewer for 35th ACM International Conference on Supercomputing (ICS '21), 2017 USENIX Annual Technical Conference (USENIX ATC '17), 28th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA '16) and 2016 International Symposium on Code Generation and Optimization (CGO '16).
- Journal reviewer for “ACM Transactions on Architecture and Code Optimization,” “ACM Transactions on Programming Languages and Systems,” “ACM Transactions on Embedded Computing Systems,” “IEEE Transactions on Computer,” “IEEE Transactions on Parallel and Distributed Systems,” “IEEE Transactions on Software Engineering,” “IEEE Transactions on Reliability,” “IEEE Access,” “Journal of Computer Science and Technology,” “Journal of Systems and Software,” “Journal of Parallel and Distributed Computing,” “Software Testing, Verification and Reliability,” and “Concurrency and Computation: Practice and Experience.”