

Mai Zheng

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Research Interests

Storage systems, big data systems, parallel & distributed systems, system dependability & security, cloud/edge computing, data-intensive computing

Education

- 2009–2015 **Ph.D. & M.S. in Computer Science**, *The Ohio State University*, Columbus, OH, Advisor: Feng Qin.
Ph.D. Thesis: Towards Manifesting Reliability Issues in Modern Computer Systems
- 2006–2009 **M.S. in Electronic Science & Technology**, *University of Science & Technology of China*, Hefei, China, Advisor: Li Guo.
Master Thesis: Panoramic Video from Unstructured Webcams
- 2002–2006 **B.S. in Electronic Science & Technology**, *Qingdao University*, Qingdao, China.

Professional Experience

- 2015–Present **Assistant Professor**, *New Mexico State University*, Las Cruces, NM.
- 2009–2015 **Research & Teaching Assistant**, *The Ohio State University*, Columbus, OH.
- 2012–2015 **Research Intern & Visiting Scholar**, *HP Labs*, Palo Alto, CA.
Mentors: Joseph Tucek & Mark Lillibridge
- 2006–2009 **Research & Teaching Assistant**, *University of Science & Technology of China*, Hefei, China.

Honors & Awards & Grants

- 2018 **Best Paper Honorable Mention**, USENIX FAST
- 2017–2020 NSF Award#1717630 (**Principal Investigator**), SHF: Small: Collaborative Research: Uncovering Vulnerabilities in Parallel File Systems for Reliable High Performance Computing
- 2017–2020 NSF Award#1730653 (Senior Personnel), CyberTraining: CDL: Cyber Infrastructure Training and Mentoring (CI-TraM)
- 2017 Device Donation, Souder Miller and Associates (SMA) Co. Ltd.
- 2016–2019 NSF Award#1566554 (**Principal Investigator**), CRII: CSR: Towards Pinpointing the Root Causes of Failures in Flash-based Storage Systems
- 2016–2019 NSF Award#1559723 (Senior Personnel), REU Site: BIGDatA – Big Data Analytics for Cyber-Physical Systems

- 2017 Travel Grant, College of Arts & Science, New Mexico State University
- 2016 Mini Grant, College of Arts & Science, New Mexico State University
- 2015 GERC (Graduate Engineering Research Colloquium) Award, The Ohio State Univ.
- 2014 USENIX OSDI Diversity Grant
- 2013 USENIX FAST Travel Grant
- 2011 ACM PPOPP Travel Grant
- 2009 University Fellowship, The Ohio State University
- 2008 Huawei Fellowship, Huawei Technologies Co. Ltd.
- 2004 Yucai Fellowship, Tsingtao Brewery Co. Ltd.

Media Coverage

- 2017 **Reliability of File System Checkers**, *StorageMojo*, storagemojo.com/2017/03/02/fsck-interruptus-and-your-data/.
- 2013 **Reliability of Flash-based Solid State Drives**, *Slashdot*, hardware.slashdot.org/story/13/03/01/224257/how-power-failures-corrupt-flash-ssd-data; *The RISKS Digest*, catless.ncl.ac.uk/Risks/27.18.html; *ZDNet*, www.zdnet.com/how-ssd-power-faults-scramble-your-data-7000011979; *InfoWorld*, www.infoworld.com/article/2613584/flash-storage; etc.

Peer-Reviewed Publications

(underlined are my students)

- ICS'18 Jinrui Cao, Om Rameshwar Gatla, **Mai Zheng**, Dong Dai, Vidya Eswarappa, Yan Mu, and Yong Chen, "PFault: A General Framework for Analyzing the Reliability of High-Performance Parallel File Systems". *Proceedings of the 32nd ACM SIGARCH International Conference on Supercomputing*, 2018
- CoDA'18 Panika Valecha, Huiping Cao, Qixu Gong, **Mai Zheng**, Feng Yan, Xing Lin and (Poster) Art Harkin, "Analysis and Prediction of Storage Error Events for High Performance Computing Systems". *Department of Energy (DOE) Conference on Data Analysis*, 2018
- FAST'18 Om Rameshwar Gatla, Muhammad Hameed, **Mai Zheng**, Viacheslav Dubeyko, (Best Paper Nominee) Adam Manzanares, Filip Blagojevic, Cyril Guyot, and Robert Mateescu, "Towards Robust File System Checkers". *Proceedings of the 16th USENIX Conference on File and Storage Technologies*, 2018
- IGSC'17 Li Li, Bruce Beitman, **Mai Zheng**, Xiaorui Wang and Feng Qin, "eDelta: Pinpointing Energy Deviations in Smartphone Apps via Comparative Trace Analysis". *Proceedings of the 8th International Green and Sustainable Computing Conference*, 2017
- IGSC'17 Li Li, Yunhao Bai, Xiaorui Wang, **Mai Zheng** and Feng Qin, "Selective Checkpointing for Minimizing Recovery Energy and Efforts of Smartphone Apps". *Proceedings of the 8th International Green and Sustainable Computing Conference*, 2017

- HotStorage'17 Om Rameshwar Gatla and **Mai Zheng**, "Understanding the Fault Resilience of File System Checkers". *Proceedings of the 9th USENIX Workshop on Hot Topics in Storage and File Systems*, 2017
- FAST'17 Om Rameshwar Gatla and **Mai Zheng**, "On Fault Resilience of File System Checkers". *Work in Progress (WiP) & Poster Sessions, 15th USENIX Conference on File and Storage Technologies*, 2017
- NVMW'17 Simeng Wang, Jinrui Cao, Om Rameshwar Gatla, Muhammad Hameed, and **Mai Zheng** (Poster), "Do Not Blame Devices for All Failures ". *Poster Session, 8th Annual Non-Volatile Memories Workshop*, 2017
- REUNS'17 Yiliang Shi, Danny V. Murillo, Simeng Wang, Jinrui Cao, and **Mai Zheng**, "A Command-Level Study of Linux Kernel Bugs". *The 3rd National Workshop for REU Research in Networking and Systems*, 2017
- TOCS'16 **Mai Zheng**, Joseph Tucek, Feng Qin, Mark Lillibridge, Bill W Zhao, and Elizabeth S Yang, "Reliability Analysis of SSDs under Power Fault". *ACM Transactions on Computer Systems*, 2016
- SC'16 PDSW-DISCS Jinrui Cao, Simeng Wang, Dong Dai, **Mai Zheng**, and Yong Chen, "A Generic Framework for Testing Parallel File Systems". *Proceedings of the 1st ACM SIGHPC Joint International Workshop on Parallel Data Storage and Data Intensive Scalable Computing Systems, held in conjunction with ACM/IEEE Supercomputing*, 2016
- NAS'16 Simeng Wang, Jinrui Cao, Danny V. Murillo, Yiliang Shi, and **Mai Zheng**, "Emulating Realistic Flash Device Errors with High Fidelity". *Proceedings of the 11th IEEE International Conference on Networking, Architecture, and Storage*, 2016
- KBS'16 Yongsheng Hao, Lina Wang, and **Mai Zheng**, "An Adaptive Algorithm for Scheduling Parallel Jobs in Meteorological Cloud". *Journal of Knowledge-based Systems*, 2016
- DOENet'16 Satyajayant Misra and **Mai Zheng**, "Rethinking Networking in a Non-volatile, Heterogeneous World". *Department of Energy (DOE) Workshop on Network Research Problems and Challenges*, 2016
- NSFCloud'14 **Mai Zheng**, Joseph Tucek, Feng Qin, and Mark Lillibridge, "A Reliability Analysis Framework for Cloud Storage Systems". *National Science Foundation (NSF) Workshop on Experimental Support for Cloud Computing*, 2014
- OSDI'14 **Mai Zheng**, Joseph Tucek, Dachuan Huang, Feng Qin, Mark Lillibridge, Elizabeth S Yang, Bill W Zhao, and Shashank Singh, "Torturing Databases for Fun and Profit". *Proceedings of the 11th USENIX Symposium on Operating Systems Design and Implementation*, 2014
- TPDS'14 **Mai Zheng**, Vignesh T. Ravi, Feng Qin, and Gagan Agrawal, "GMRace: Detecting Data Races in GPU Programs via A Low-Overhead Scheme". *IEEE Transactions on Parallel and Distributed Systems*, 2014
- FAST'13 **Mai Zheng**, Joseph Tucek, Feng Qin, and Mark Lillibridge, "Understanding the Robustness of SSDs under Power Fault". *Proceedings of the 11th USENIX Conference on File and Storage Technologies*, 2013

- MASCOTS'13 Dachuan Huang, Xuechen Zhang, Wei Shi, **Mai Zheng**, Song Jiang, and Feng Qin, "LiU: Hiding Disk Access Latency for HPC Applications with a New SSD-Enabled Data Layout". *Proceedings of the 21st IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, 2013
- HiPC'12 **Mai Zheng**, Vignesh T. Ravi, Wenjing Ma, Feng Qin, and Gagan Agrawal, "GMProf: A Low-Overhead, Fine-Grained Profiling Approach for GPU Programs". *Proceedings of the 19th IEEE International Conference on High Performance Computing*, 2012
- WCRE'12 Dawei Qi, William Sumner, Feng Qin, **Mai Zheng**, Xiangyu Zhang and Abhik Roychoudhury, "Modeling Software Execution Environment". *Proceedings of the 19th Working Conference on Reverse Engineering*, 2012
- ASPLOS'11 Qi Gao, Wenbin Zhang, Zhezhe Chen, **Mai Zheng**, and Feng Qin, "2ndStrike: Towards Manifesting Hidden Concurrency Typestate Bugs". *Proceedings of the 16th ACM International Conference on Architectural Support for Programming Languages and Operating Systems*, 2011
- PPoPP'11 **Mai Zheng**, Vignesh T. Ravi, Feng Qin, and Gagan Agrawal, "GRace: A Low-Overhead Mechanism for Detecting Data Races in GPU Programs". *Proceedings of the 16th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming*, 2011
- JCEA'09 Jian Ji, Li Guo, **Mai Zheng**, and Lu Gao, "A Design of Programmable Pixel Shader for Mobile Devices". *Journal of Computer Engineering and Applications (Chinese)*, 2009
- ISVC'08 **Mai Zheng**, Xiaolin Chen, and Li Guo, "Stitching Video from Webcams". *Proceedings of the 4th International Symposium on Visual Computing*, 2008
- ICSP'08 **Mai Zheng**, Jian Ji, Li Guo, and Junzhu Zhu, "A Phase-Fitting Method for Sub-pixel Displacement Measurements Using Digital Speckle Images". *Proceedings of the 9th IEEE International Conference on Signal Processing*, 2008
- ICCSIT'08 **Mai Zheng**, Antai Guo, Wei Zhong, and Li Guo, "Image Stitching of Scenes with Large Misregistration". *Proceedings of International Conference on Computer Science and Information Technology*, 2008
- JCEA'08 Bingqin Wang, Li Guo, and **Mai Zheng**, "A Sub-Pixel Image Registration Algorithm for Panoramic Image Mosaics". *Journal of Computer Engineering and Applications (Chinese)*, 2008

Teaching

- NMSU479/579 Special Topics: Modern Storage Systems: Flash, Cloud, & Beyond (Spring 2016)
- NMSU479/579 Special Topics: Reliable Storage Systems (Fall 2017)
- NMSU 474 Operating Systems I (Fall 2015, Fall 2016)
- NMSU 574 Operating Systems II (Spring 2017, Spring 2018)
- NMSU 473 Computer Architecture I (Spring 2018)
- NMSU 573 Computer Architecture II (Fall 2017)
- NMSU491/521 Parallel Programming (Fall 2016)
- OSU 4251 The UNIX Programming Environment (Fall 2014, Spring 2015)

Student Mentoring

- Ph.D. Jinrui Cao (Spring 2016 – Present)
Om Rameshwar Gatla (Summer 2016 – Present)
- Master Muhammad Hameed (Spring 2017 – Present)
Yuan Xu (Summer 2017 – Present)
Ryan Chartier (Fall 2017 – Present)
Chase Gilbert (Fall 2017 – Present)
Simeng Wang (2016 – 2017, now @TaoCloud)
- Undergraduate Kristopher Chesney (NSF BIGData REU Program, 2017)
Chelsea Deane (NSF BIGData REU Program, 2017)
Danny V. Murillo (NSF BIGData REU Program, 2016)
Yiliang Shi (NSF BIGData REU Program, 2016)

Professional Activities

- Technical Program Committee IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), 2017, 2018; The 6th IEEE International Conference on Future Internet of Things and Cloud (FiCloud), 2018; The 3rd IEEE International Conference on Fog and Mobile Edge Computing (FMEC), 2018; The 1st Workshop on Machine Learning for Computing Systems (MLCS), 2018; The 10th ACM/IEEE International Conference on Utility and Cloud Computing (UCC), 2017; IEEE/ACM International Symposium on Quality of Service (IWQoS), 2016, 2017; IEEE Annual Computing and Communication Workshop and Conference (CCWC), 2017, 2018; National Workshop for REU Research in Networking and Systems (REUNS), 2016, 2017; The 1st Workshop on Data-Centric Infrastructure for Big Data Science (DIBS), 2015.
- Organizing Committee Proceedings Chair, The 27th ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC), 2018.
- Reviewer IEEE Transactions on Parallel and Distributed Systems (TPDS), 2013 - 2018; IEEE Transactions on Reliability (TR), 2018; Journal of Parallel and Distributed Computing (JPDC), 2018; ACM Transactions on Storage (TOS), 2016; ACM Transactions on Embedded Computer Systems (TECS), 2015; IEEE Transactions on Computers (TC), 2014, 2015; IET Computers & Digital Techniques, 2017; Kentucky Science & Engineering Foundation (KSEF), 2016.
- Panelist National Science Foundation (NSF), 2016.
- Others Campus Representative of USENIX Association, 2017 - Present.