

# 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/](http://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](http://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](http://catless.ncl.ac.uk/Risks/27.18.html); *ZDNet*, [www.zdnet.com/how-ssd-power-faults-scramble-your-data-7000011979](http://www.zdnet.com/how-ssd-power-faults-scramble-your-data-7000011979); *InfoWorld*, [www.infoworld.com/article/2613584/flash-storage](http://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; 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.