

# Haryadi S. Gunawi

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## Research Interests

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Areas: Operating Systems, File/Storage Systems, Cloud/Distributed Systems

Focus: Building dependable cloud-scale distributed and storage systems in the context of:

- (1) Reliability (combating distributed concurrency and crash bugs)
- (2) Performance (tolerating limpware/tail latencies in storage systems)
- (3) Scalability (combating latent scalability bugs)

## Appointments

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- Assistant Professor                      University of Chicago                      July 2012 - Current  
    Neubauer Family Award 2012-2017
- Visiting Researcher (Invited)      Microsoft Research                      June 2016
- Postdoctoral Fellow                      University of California, Berkeley                      January 2010 - July 2012

## Education

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- Ph.D. in Computer Science      University of Wisconsin, Madison                      December 2009  
    Thesis: Towards Reliable Storage Systems  
    Awarded the 2009 ACM Doctoral Dissertation Award, Honorable Mention  
    Awarded the 2009 Departmental Best Thesis Award
- B.S. in Computer Engineering      University of Wisconsin, Madison                      December 2001  
    Double major in Comp. Science and Comp. Engineering (and Graduated with Distinction)

## Honors and Awards

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- Program Co-Chair, USENIX Annual Technical Conference (70 PC members, 380 submissions)                      2018
- File and Storage Technologies (FAST) Best Paper Nominee                      2018
- File and Storage Technologies (FAST) Best Paper Nominee                      2017
- Keynote Speaker at IEEE Cloud Resiliency Workshop                      2017
- Google Research Award                      2015
- NetApp Faculty Fellowship                      2015
- NSF CAREER Award                      2014
- NetApp Faculty Fellowship                      2013
- Neubauer Family Assistant Professorship, Univ. of Chicago                      2012
- CCC/CRA/NSF Computing Innovation Fellow                      2009
- ACM Doctoral Dissertation Award, Honorable Mention                      2009
- Departmental Outstanding Graduate Student Research Award, Univ. of Wisconsin                      2009
- Finalist, Microsoft Research Ph.D. Fellowship program                      2007
- Lawrence H. Landweber NCR Fellowship in Distributed Systems, Univ. of Wisconsin                      2006

## Publications

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### REFEREED CONFERENCE PUBLICATIONS

- C1. Haryadi S. Gunawi, Riza O. Suminto, Russell Sears, Casey Golliver, Swaminathan Sundararaman, Xing Lin, Tim Emami, Weiguang Sheng, Nematollah Bidokhti, Caitie McCaffrey, Gary Grider, Parks M. Fields, Kevin Harms, Robert B. Ross, Andree Jacobson, Robert Ricci, Kirk Webb, Peter Alvaro, H. Biral Runesha, Mingzhe Hao, Huaicheng Li. **Fail-Slow at Scale: Evidence of Hardware Performance Faults in Large Production Systems.** *In the Proceedings of the 16th USENIX Conference on File and Storage Technologies, 2018.* [14 pages, 23/139 (16%) acceptance rate, **Best Paper Nominee**]. FAST '18
- C2. Huaicheng Li, Mingzhe Hao, Michael Hao Tong, Swaminathan Sundararaman, Matias Bjrling, Haryadi S. Gunawi. **The CASE of FEMU: Cheap, Accurate, Scalable and Extensible Flash Emulator.** *In the Proceedings of the 16th USENIX Conference on File and Storage Technologies, 2018.* [8 pages, 23/139 (16%) acceptance rate]. FAST '18
- C3. Bernard Dickens III, Haryadi S. Gunawi, Ariel J. Feldman, Henry Hoffmann. **Strong-Box: Confidentiality, Integrity, and Performance using Stream Ciphers for Full Drive Encryption.** *In the Proceedings of the 23rd International Conference on Architectural Support for Programming Languages and Operating Systems, 2018.* [14 pages, 56/319 (17%) acceptance rate]. ASPLOS '18
- C4. Jiaxin Li, Yuxi Chen, Haopeng Liu, Shan Lu, Yiming Zhang, Haryadi S. Gunawi, Xiaohui Gu, Dongsheng Li, and Xicheng Lu. **PCatch: Automatically Detecting Performance Cascading Bugs in Cloud Systems.** *In the 2018 EuroSys Conference, 2018.* [16 pages, 43/262 (16%) acceptance rate]. EuroSys '18
- C5. Mingzhe Hao, Huaicheng Li, Michael Hao Tong, Chrisma Pakha, Riza O. Suminto, Cesar A. Stuardo, Andrew A. Chien, and Haryadi S. Gunawi. **MittOS: Supporting Millisecond Tail Tolerance with Fast Rejecting SLO-Aware OS Interface.** *In the Proceedings of the 26th Symposium on Operating Systems Principles, 2017.* [16 pages, 39/232 (17%) acceptance rate]. SOSP '17
- C6. Riza O. Suminto, Cesar A. Stuardo, Alexandra Clark, Huan Ke, Tanakorn Leesatapornwongsa, Bo Fu, Daniar H. Kurniawan, Vincentius Martin, Uma Maheswara Rao G., and Haryadi S. Gunawi. **PBSE: A Robust Path-Based Speculative Execution for Degraded-Network Tail Tolerance in Data-Parallel Frameworks.** *In the Proceedings of the 2017 Symposium on Cloud Computing, 2017.* [14 pages, 48/203 (24%) acceptance rate]. SoCC '17
- C7. Shiqin Yan, Huaicheng Li, Mingzhe Hao, Michael Hao Tong, Swaminathan Sundararaman, Andrew A. Chien, Haryadi S. Gunawi. **Tiny-Tail Flash: Near-Perfect Elimination of Garbage Collection Tail Latencies in NAND SSDs.** *In the Proceedings of the 15th USENIX Conference on File and Storage Technologies, 2017.* [14 pages, 28/116 (24%) acceptance rate, **Best Paper Nominee**]. FAST '17
- C8. Haopeng Liu, Guangpu Li, Jeffrey F. Lukman, Jiaxin Li, Shan Lu, Haryadi S. Gunawi, Chen Tian. **DCatch: Automatically Detecting Distributed Concurrency Bugs in Cloud Systems.** *In the Proceedings of the 22nd ACM International Conference on Architectural Support for Programming Languages and Operating Systems, 2017.* [15 pages, 56/321 (17%) acceptance rate]. ASPLOS '17

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<sup>0</sup>Notes: The following 5 publications, as listed above, are led by other research groups that I have collaborated with: PCatch [EuroSys '18], StrongBox [ASPLOS '18], DCatch [ASPLOS '17], and Dynamic Cloud [CIC '17], and HardFS [FAST '13].

- C9. Fan Yang, Haryadi S. Gunawi, Andrew A. Chien. **Exploring the Challenges and Opportunities of Cloud Stacks in Dynamic Resource Environments.** *In the Proceedings of the IEEE 3rd International Conference on Collaboration and Internet Computing, 2017.* CIC '17
- C10. Haryadi S. Gunawi, Mingzhe Hao, Riza O. Suminto, Agung Laksono, Anang D. Satria, Jeffrey Adityatama, Kurnia J. Eliazar. **Why Does the Cloud Stop Computing? Lessons from Hundreds of Service Outages.** *In Proceedings of the 7th ACM Symposium on Cloud Computing, 2016.* [16 pages, 38/151 (25%) acceptance rate]. SoCC '16
- C11. Tanakorn Leesatapornwongsa, Jeffrey F. Lukman, Shan Lu, and Haryadi S. Gunawi. **TaxDC: A Taxonomy of Non-Deterministic Concurrency Bugs in Datacenter Distributed Systems.** *In the Proceedings of the 21th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, 2016.* [14 pages, 53/240 (22%) acceptance rate]. ASPLOS '16
- C12. Mingzhe Hao, Gokul Soundararajan, Deepak Kenchammana, Andrew A. Chien, and Haryadi S. Gunawi. **The Tail at Store: A Revelation from Millions of Hours of Disk and SSD Deployments.** *In the Proceedings of the 14th USENIX Conference on File and Storage Technologies, 2016.* [14 pages, 27/115 (23%) acceptance rate, **rated 6th<sup>1</sup>**]. FAST '16
- C13. Tiratat Patana-anake, Vincentius Martin, Nora Sandler, Cheng Wu, and Haryadi S. Gunawi. **Manylogs: Improved CMR/SMR Disk Bandwidth and Faster Durability with Scattered Logs.** *In the Proceedings of 32nd International Conference on Massive Storage Systems and Technology, 2016.* [16 pages, 21/71 (30%) acceptance rate]. MSST '16
- C14. Tanakorn Leesatapornwongsa, Mingzhe Hao, Pallavi Joshi, Jeffrey F. Lukman, Haryadi S. Gunawi. **SAMC: Semantic-Aware Model Checking for Fast Discovery of Deep Bugs in Cloud Systems.** *In the 11th USENIX Symposium on Operating Systems Design and Implementation, 2014.* [16 pages, 42/228 (18%) acceptance rate, **rated 3rd**]. OSDI '14
- C15. Haryadi S. Gunawi, Mingzhe Hao, Tanakorn Leesatapornwongsa, Tiratat Patana-anake, Thanh Do, Jeffrey Adityatama, Kurnia J. Eliazar, Agung Laksono, Jeffrey F. Lukman, Vincentius Martin, and Anang D. Satria. **What Bugs Live in the Cloud? A Study of 3000+ Issues in Cloud Systems.** *In Proceedings of the 5th ACM Symposium on Cloud Computing, 2014.* [14 pages, 29/119 (24%) acceptance rate, **rated 3rd**]. SoCC '14
- C16. Tanakorn Leesatapornwongsa and Haryadi S. Gunawi. **The Case for Drill-Ready Cloud Computing.** *In Proceedings of the 5th ACM Symposium on Cloud Computing, 2014.* [8 pages, 29/119 (24%) acceptance rate]. SoCC '14
- C17. Thanh Do, Mingzhe Hao, Tanakorn Leesatapornwongsa, Tiratat Patana-anake, and Haryadi S. Gunawi. **Limplock: Understanding the Impact of Limpware on Scale-Out Cloud Systems.** *In Proceedings of the 4th ACM Symposium on Cloud Computing, 2013.* [14 pages, 23/114 (20%) acceptance rate, **rated 2nd**]. SoCC '13
- C18. Thanh Do, Tyler Harter, Yingchao Liu, Haryadi S. Gunawi, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. **HARDFS: Hardening HDFS with Selective and Lightweight Versioning.** *In Proceedings of the 11th USENIX Conference on File and Storage Technologies, 2013.* [14 pages, 24/127 (19%) acceptance rate]. FAST '13

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<sup>1</sup>Rating is based on the "Overall Recommendation" metric from the reviewing systems (e.g., HotCRP).

@ UC Berkeley (postdoctoral period):

- C19. Haryadi S. Gunawi, Thanh Do, Pallavi Joshi, Peter Alvaro, Joseph M. Hellerstein, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Koushik Sen, and Dhruba Borthakur. **FATE and DESTINI: A Framework for Cloud Recovery Testing**. In *Proceedings of the 8th Symposium on Networked Systems Design and Implementation, 2011*. [14 pages, 27/157 (17%) acceptance rate]. NSDI '11
- C20. Pallavi Joshi, Haryadi S. Gunawi, and Koushik Sen. **PreFail: A Programmable Tool for Multiple-Failure Injection**. In *Proceedings of the 26th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications, October 2011*. [17 pages, 61/166 (37%) acceptance rate]. OOPSLA '11

@ Univ. of Wisconsin (PhD period):

- C21. Sriram Subramanian, Yupu Zhang, Rajiv Vaidyanathan, Haryadi S. Gunawi, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Jeffrey F. Naughton. **Impact of Disk Corruption on Open-Source DBMS**. In *the 26th IEEE International Conference on Data Engineering, 2010*. [12 pages, 69/523 (13%) acceptance rate]. ICDE '10
- C22. Cindy Rubio-González, Haryadi S. Gunawi, Ben Liblit, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. **Error Propagation Analysis for File Systems**. In *ACM SIGPLAN 2009 Conf. on Programming Language Design and Implementation, 2009*. [11 pages, 41/194 (21%) acceptance rate]. PLDI '09
- C23. Haryadi S. Gunawi, Abhishek Rajimwale, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. **SQCK: A Declarative File System Checker**. In *Proceedings of the 8th USENIX Symposium on Operating Systems Design and Implementation, 2008*. [16 pages, 26/193 (13%) acceptance rate, **rated 4th**]. OSDI '08
- C24. Haryadi S. Gunawi, Cindy Rubio-González, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Ben Liblit. **EIO: Error-handling is Occasionally Correct**. In *Proceedings of the 6th USENIX Conference on File and Storage Technologies, 2008*. [16 pages, 21/94 (22%) acceptance rate]. FAST '08
- C25. Haryadi S. Gunawi, Vijayan Prabhakaran, Swetha Krishnan, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. **Improving File System Reliability with I/O Shepherd-ing**. In *Proceedings of the 21st ACM Symposium on Operating Systems Principles, 2007*. [14 pages, 25/131 (19%) acceptance rate]. SOSP '07
- C26. Vijayan Prabhakaran, Lakshmi N. Bairavasundaram, Nitin Agrawal, Haryadi S. Gunawi, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. **IRON File Systems**. In *Proceedings of the 20th ACM Symposium on Operating Systems Principles, 2005*. [15 pages, 20/155 (13%) acceptance rate]. SOSP '05
- C27. Haryadi S. Gunawi, Nitin Agrawal, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Jiri Schindler. **Deconstructing Commodity Storage Clusters**. In *Proceedings of the 32nd International Symposium on Computer Architecture, 2005*. [12 pages, 45/194 (23%) acceptance rate]. ISCA '05

- C28. Haryadi S. Gunawi, Andrea C. Arpaci-Dusseau, and Remzi H. Arpaci-Dusseau. **Deploying Safe User-Level Network Services with icTCP**. In *Proceedings of the 6th USENIX Symposium on Operating Systems Design and Implementation, 2004*. [16 pages, 27/193 (14%) acceptance rate]. OSDI '04
- C29. Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Nathan C. Burnett, Timothy E. Denehy, Thomas J. Engle, Haryadi S. Gunawi, James A. Nugent, and Florentina I. Popovici. **Transforming Policies into Mechanisms with Infokernel**. In *Proceedings of the 19th ACM Symposium on Operating Systems Principles, 2003*. [16 pages, 22/128 (17%) acceptance rate]. SOSP '03

### REFEREED JOURNAL PUBLICATIONS

- C1. Haryadi S. Gunawi, Riza O. Suminto, Russell Sears, Casey Golliver, Swaminathan Sundararaman, Xing Lin, Tim Emami, Weiguang Sheng, Nematollah Bidokhti, Caitie McCaffrey, Gary Grider, Parks M. Fields, Kevin Harms, Robert B. Ross, Andree Jacobson, Robert Ricci, Kirk Webb, Peter Alvaro, H. Biral Runesha, Mingzhe Hao, Huaicheng Li. **Fail-Slow at Scale: Evidence of Hardware Performance Faults in Large Production Systems**. *ACM Transactions on Storage, 2018 (Invited, and Under Preparation)*. [24 pages, **Fast-tracked**]. TOS '18
- C2. Shiqin Yan, Huaicheng Li, Mingzhe Hao, Michael Hao Tong, Swaminathan Sundararaman, Andrew A. Chien, Haryadi S. Gunawi. **Tiny-Tail Flash: Near-Perfect Elimination of Garbage Collection Tail Latencies in NAND SSDs**. *ACM Transactions on Storage, Volume 13, Issue #3, September 2017*. [24 pages, **Fast-tracked**]. TOS '17

### REFEREED WORKSHOP AND DEMO<sup>d</sup> PUBLICATIONS

- W1. Tanakorn Leesatapornwongsa, Cesar A. Stuardo, Riza O. Suminto, Huan Ke, Jeffrey F. Lukman, Haryadi S. Gunawi. **Scalability Bugs: When 100-Node Testing is Not Enough**. In *the 16th Workshop on Hot Topics in Operating Systems, 2017*. [8 pages, 29/94 (30%) acceptance rate]. HotOS '17
- W2. Riza O. Suminto, Agung Laksono, Anang D. Satria, Thanh Do and Haryadi S. Gunawi. **Towards Pre-Deployment Detection of Performance Failures in Distributed Systems**. In *the 7th USENIX Workshop on Hot Topics in Cloud Computing, 2015*. [7 pages, 21/64 (33%) acceptance rate]. HotCloud '15
- W3. Tanakorn Leesatapornwongsa and Haryadi S. Gunawi. **SAMC: A Fast Model Checker for Finding Heisenbugs in Distributed Systems**. *Demo<sup>d</sup> Paper at the ACM International Symposium on Software Testing and Analysis, 2015*. [5 pages]. <sup>d</sup>ISSTA '15
- W4. Thanh Do and Haryadi S. Gunawi. **The Case for Limping-Hardware Tolerant Clouds**. In *the 5th USENIX Workshop on Hot Topics in Cloud Computing, 2013*. [6 pages, 21/74 (28%) acceptance rate]. HotCloud '13
- W5. Haryadi S. Gunawi, Thanh Do, Pallavi Joshi, Joseph M. Hellerstein, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Koushik Sen. **Towards Automatically Checking Thousands of Failures with Micro-specifications**. In *the 6th Workshop on Hot Topics in System Dependability, 2010*. [6 pages, 11/29 (38%) acceptance rate]. HotDep '10

## MISCELLANEOUS (ARTICLES<sup>a</sup>, POSTERS<sup>p</sup>, WIPS<sup>w</sup>, AND TECH. REPORTS)

- M1. Haryadi S. Gunawi et al. (see FAST '18 version). **Fail-Slow at Scale: Evidence of Hardware Performance Faults in Large Production Systems.** *USENIX ;login: Magazine (In Preparation)*. <sup>a</sup>;login: '18
- M2. Fan Yang, Andrew A. Chien, Haryadi S. Gunawi **Resilient Cloud in Dynamic Resource Environments.** *Poster*. <sup>p</sup>SoCC '17
- M3. T. Leesatapornwongsa, C. Stuardo, H. Ke, J. F. Lukman, R. O. Suminto, D. H. Kurniawan, and H. S. Gunawi **SCK: Scale-Checking and Debugging Scalability Bugs on One Machine.** *Poster*. <sup>p</sup>OSDI '16
- M4. R. O. Suminto, C. Stuardo, A. Clark, H. Ke, B. Fu, T. Leesatapornwongsa, V. Martin, D. H. Kurniawan, and H. S. Gunawi. **PBSE: Path-Based Speculative Execution for Robust Tail Tolerance in Data-Parallel Systems.** *Poster*. <sup>p</sup>OSDI '16
- M5. S. Yan, H. Li, M. Hao, H. Tong, S. Sundararaman, A. A. Chien, and H. S. Gunawi. **Tiny-Tail Flash: Near-Perfect Elimination of Garbage Collection Tail Latencies.** *Poster*. <sup>p</sup>OSDI '16
- M6. H. S. Gunawi, T. Do, A. Laksono, M. Hao, T. Leesatapornwongsa, J. F. Lukman, and R. O. Suminto. **What Bugs Live in the Cloud?: A Study of Issues in Scalable Distributed Systems.** *USENIX ;login: Magazine, Vol. 40, No. 4*. <sup>a</sup>;login: '15
- M7. R. O. Suminto, T. Do, and H. S. Gunawi. **Finding Limplock Bugs in Scalable Cloud Systems.** *Poster*. <sup>p</sup>OSDI '14
- M8. T. Patana-anake, C. Chen, N. Sandler, and H. S. Gunawi. **Improving Multi-Tenant Storage Performance with I/O Sheltering.** *WIP Presentation and Poster*. <sup>w</sup>pFAST '14
- M9. H. S. Gunawi. **The Case for Limpware-Tolerant Operating Systems.** *WIP Presentation*. <sup>w</sup>SOSP '13
- M10. T. Do and H. S. Gunawi. **Impact of Limpware on HDFS: A Probabilistic Estimation.** *University of Chicago, Computer Science, #TR-2013-08*. TR '13

## Grants (Government<sup>g</sup> and Industry<sup>i</sup>)

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- <sup>i</sup> Haryadi S. Gunawi (PI) and Andrew A. Chien. **Operating System and Runtime Supports for Millisecond-level Tail Tolerance.** *Univ. of Chicago CERES Center, 2017-2018*.
- <sup>i</sup> Shan Lu and Haryadi S. Gunawi (Co-PI). *Huawei Research Grant 2017*.
- <sup>i</sup> Haryadi S. Gunawi (PI) and Shan Lu. **Cascading Outage Bugs Elimination.** *Univ. of Chicago CERES Center, 2016-2017*.
- <sup>g</sup> Haryadi S. Gunawi (PI) and Shan Lu. **Combating Distributed Concurrency Bugs in Cloud Systems.** *NSF grant# CNS-1563956, 2016-2020, \$799,974*.
- <sup>g</sup> Haryadi S. Gunawi (PI) and Henry Hoffmann. **BreezeFS: File System Transformation for Cloud and Multistore Era.** *NSF grant# CNS-1526304, 2015-2018, \$498,013*.

- 6.<sup>i</sup> Shan Lu and Haryadi S. Gunawi (both PIs). **Limplock-Free Cloud Systems**. *Univ. of Chicago CERES Center, 2015-2016*.
- 7.<sup>i</sup> Haryadi S. Gunawi (PI) and Shan Lu. *Google Faculty Research Award 2015*, \$55,260.
- 8.<sup>i</sup> Haryadi S. Gunawi (PI). *NetApp Faculty Fellowship 2015*, \$45,000.
- 9.<sup>i</sup> Shan Lu and Haryadi S. Gunawi (Co-PI). *Huawei Research Grant 2015*, \$193,761.
- 10.<sup>9</sup> Haryadi S. Gunawi (PI). **DrCloud: Drill-Ready Cloud Computing**. *NSF CAREER grant# CNS-1350499, 2014-2019*, \$449,349.
- 11.<sup>9</sup> Andrew Chien, Ian Foster, Haryadi Gunawi (Co-PI), Henry Hoffmann, L. Ridgway Scott. **RIVER: A Research Infrastructure to Explore Volatility**. *NSF grant# CNS-1405959, Computing Research Infrastructure (CRI) program, 2014-2017*, \$997,432.
- 12.<sup>i</sup> Haryadi S. Gunawi (PI). *NetApp Faculty Fellowship 2013*, \$45,000.
- 13.<sup>9</sup> Haryadi S. Gunawi (PI), Andrew Chien, Dries Kimpe, and Rob Ross. **LigHTS: Limping-Hardware Tolerant Systems**. *NSF grant# CCF-1336580, Exploiting Parallelism and Scalability (XPS) program, 2013-2017*, \$749,854.
- 14.<sup>9</sup> Haryadi S. Gunawi (PI). **DARE: Declarative and scAlable REcovery**. *NSF grants# CCF-1321958 (Data-Intensive Computing program), 2013-2014*, \$235,663.

## Talks

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1.	U. Texas	<b>Bugs at Scale: What New Bugs Live in the Cloud and How to Exterminate Them</b>	Feb '18
2.	Princeton	"_"	Jan '18
3.	Harvard	"_"	Nov '17
4.	Columbia	"_"	Apr '17
5.	Cornell	"_"	Apr '17
6.	NYU	"_"	Apr '17
7.	CMU	"_"	Apr '17
8.	Twitter	"_"	Mar '17
9.	U. Michigan	"_"	Dec '16
10.	Huawei Labs	"_"	Oct '16
11.	IEEE CRW	"_" (Keynote)	Oct '16
12.	Microsoft Res.	"_"	Jun '16
13.	U. Wisconsin	"_"	Sep '15
14.	Google	"_"	Jul '15
15.	Facebook	"_"	Jul '15
16.	NetApp	<b>Scalability Bugs: When 100-Node Testing is Not Enough</b>	Feb '18
17.	HotOS '17	"_"	May '17
18.	NetApp	<b>MittOS: OS Support for Millisecond Tail Tolerance</b>	Feb '18
19.	SoCC	<b>Why Does the Cloud Stop Computing?</b>	Oct '16
20.	Microsoft Azure	"_"	Jun '16
21.	CERES Summit	"_" (Keynote)	Jan '16

22.	NetApp	<b>Tiny-Tail Flash: Near-Perfect Elimination of GC Tail Latencies</b>	Oct '16
23.	Huawei Labs	“_”	Oct '16
24.	IBM	<b>The Tail at Store: A Large-Scale Analysis of Storage Variability</b>	Jul '15
25.	SanDisk	“_”	Jul '15
26.	CRW	<b>The Case for LIGHTS: Limping-Hardware Tolerant Systems</b>	Oct '17
27.	GCASR	“_”	May '14
28.	Cloudera	“_”	Feb '14
29.	Facebook	“_”	Sep '13
30.	Purdue	“_”	Sep '13
31.	ANL	“_”	Jul '13
32.	HotCloud '13	“_”	Jun '13

*Postdoctoral period:*

33.	NSDI '11	<b>Fate and Destini: A Framework for Cloud Recovery Testing</b>	Mar '11
34.	UC Berkeley	“_”	Mar '11
35.	Google	“_”	Nov '10
36.	Yahoo!	“_”	Nov '10
37.	Facebook	“_”	Nov '10
38.	Twitter	“_”	Nov '10
39.	Cloudera	“_”	Nov '10
40.	NetApp	“_”	Nov '10
41.	LANL	“_”	Nov '10

*PhD period:*

42.	UC Berkeley	Towards Reliable Storage Systems	Mar '10
43.	CMU	“_”	Apr '09
44.	Microsoft Rsch	“_”	Mar '09
45.	OSDI '08	SQCK: A Declarative File System Checker	Dec '08
46.	FAST '08	EIO: Error-handling is Occasionally Correct	Feb '08
47.	NetApp	“_”	Nov '07
48.	SOSP '07	Improving File System Reliability with I/O Shepherding	Oct '07
49.	ISCA '05	Deconstructing Commodity Storage Clusters	Jun '05
50.	EMC	“_”	Jun '05
51.	OSDI '04	Deploying Safe User-Level Network Services with icTCP	Dec '04

## Teaching

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- CS 154: Introduction to Computer Systems (Spring every year from 2014 to now)
- CS 230: Operating Systems (Fall every year from 2012 to now)
- CS 331: Advanced Operating Systems (Winter 2013, 2014)
- CS 332: Topics in Operating Systems – Cloud storage and new storage technology (Fall 2013, Winter 2018)

## Services and Other Activities

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**Program Chair/Co-Chair, Associate Editors:**

ATC '18	USENIX Annual Technical Conference (70 PC members, 380 submissions)
TOS '17/18	Associate Editors for ACM Transactions on Storage
GCASR '15	Co-Chair for Greater Chicago Area Systems Research Workshop



**Organizational Work:**

SoCC '17	Publicity Chair
FAST '16	Co-Chair for WIP and Poster Sessions
SoCC '13	Co-Chair for Travel Scholarships

**Program Committee:**

1. FAST '19	USENIX Conference on File and Storage Technologies
2. NSDI '19	USENIX Symposium on Networked Systems Design and Implementation
3. ATC '18	USENIX Annual Technical Conference
4. FAST '18	USENIX Conference on File and Storage Technologies
5. OSDI '18	USENIX Symposium on Operating Systems Design and Implementation
6. SoCC '18	ACM Symposium on Cloud Computing
7. VLDB '18	Intl' Conference on Very Large Data Bases
8. HotCloud '17	USENIX Workshop on Hot Topics in Cloud Computing
9. HPDC '17	ACM Symposium on High-Performance Parallel and Distributed Computing
10. ICDCS '17	IEEE International Conference on Distributed Computing Systems
11. Middleware '17	ACM/IFIP/USENIX Intl' Middleware Conf.
12. SoCC '17	ACM Symposium on Cloud Computing
13. SOSR SRC '17	Student Research Competition at ACM Symposium on Operating Systems Principles
14. ASPLOS '16 (ERC)	Intl' Conf. on Architectural Support for PL and OS
15. ATC '16	USENIX Annual Technical Conference
16. CLOUD '16	IEEE International Conference on Cloud Computing
17. FAST '16	USENIX Conference on File and Storage Technologies
18. HotStorage '16	USENIX Workshop on Hot Topics in Storage and File Systems
19. VLDB '16	Intl' Conference on Very Large Data Bases
20. ASPLOS '15 (ERC)	Intl' Conf. on Architectural Support for PL and OS
21. ATC '15	USENIX Annual Technical Conference
22. CLOUD '15	IEEE International Conference on Cloud Computing
23. FAST '15	USENIX Conference on File and Storage Technologies
24. INFLOW '15	Workshop on Interactions of NVM/Flash with Operating-Systems and Workloads
25. MSST '15	Intl' Conference on Massive Storage Systems and Technology
26. HotCloud '14	USENIX Workshop on Hot Topics in Cloud Computing
27. HPDC '14	ACM Symposium on High-Performance Parallel and Distributed Computing
28. INFLOW '14	Workshop on Interactions of NVM/Flash with Operating-Systems and Workloads
29. MSST '14	Intl' Conference on Massive Storage Systems and Technology
30. SoCC '14	ACM Symposium on Cloud Computing
31. SoCC '13	ACM Symposium on Cloud Computing
32. VLDB '13	Intl' Conference on Very Large Data Bases
33. MSST '12	IEEE Conference on Mass Storage Systems and Technologies
34. NAS '12	IEEE Intl' Conference on Networking, Architecture, and Storage
35. ScienceCloud '12	Workshop on Scientific Cloud Computing, co-located with HPDC '12
36. VLDB '12	Intl' Conference on Very Large Data Bases
37. DBTest '10	Intl' Workshop on Testing Database Systems, co-located with SIGMOD '10
38. PDSW '11	Petascale Data Storage Workshop, co-located with Supercomputing '11

**Journal Reviewing:**

39. TOCS '16	ACM Transactions on Computer Systems
40. TOS '14	ACM Transactions on Storage
41. CSUR '13	ACM Computing Surveys
42. HPCA '13	IEEE International Symposium on High Performance Computer Architecture
43. TOC '13	IEEE Transactions on Computers
44. TOS '12	ACM Transactions on Storage
45. TKDE '12	IEEE Transactions on Knowledge and Data Engineering

**Panels:**

46. NSF CSR '17
47. NSF CAREER '15
48. NSF XPS '14
49. NSF CSR '14
50. NSF CSR '13

**Visiting:**

51. Microsoft Research      Invited to Cloud Computing and Storage group, Jun '16

**Departmental Services:**

- Graduate Program Committee (2017-present)
- Distinguished Lectures Organizer (2015)
- Coordinator for PhD Student Admission in Systems (2014 to current)
- Systems Faculty Recruiting Committee (2014, 2015)
- International outreach via remote research program (2013 to current)

**Memberships:**

ACM, IEEE, USENIX

**Advising**


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<i>Name</i>	<i>Period</i>	<i>First Employment (+ Internships in parantheses)</i>
<b>PhD Alumni:</b>		
1. Tanakorn Leesatapornwongsa	2012-2017	Samsung Research (+ NetApp, Microsoft Research)
<b>PhD Students (Current):</b>		
2. Riza O. Suminto	2013-current	(Samsung Rsch., Cloudera)
3. Huan Ke	2015-current	(Huawei)
4. Huaicheng Li	2015-current	(Microsoft Rsch.)
5. Jeffrey F. Lukman	2015-current	(Cloudera)
6. Mingzhe Hao	2015-current	(NetApp, Microsoft Rsch.)
7. Cesar Stuardo	2017-current	
8. Hao (Michael) Tong	2014-current	(EMC, VMware Research) [co-advised with Bob Grossman]
<b>Student Awards:</b>		
Mingzhe Hao	2018	Facebook PhD Fellowship Finalist
Tanakorn Leesatapornwongsa	2016	Facebook PhD Fellowship Finalist
<b>Master Students (Current and Alumni):</b>		
9. Anqi Zhang	2018	
10. Meng Wang	2018	
11. Yang Chen	2018	
12. Kelvin Ho	2018	
13. Jingjie Wan	2018	
14. Honglei Zhou	2018	
15. Hongli Bu	2018	
16. Shiqin Yan	2017	(EMC)
17. Chrisma Pakha	2017	PhD student @ TBA
18. Alexandra Clark	2017	Google
19. Xueyin Wang	2017	Facebook

20.	Bo Fu	2016	PhD student @ Purdue ECE Dept.
21.	Murphy Zhang	2015	EMC
22.	Cheng Wu	2015	Baidu
23.	Joseph Harrow	2015	Glory Global Solutions
24.	Morenvino Mochtar	2014	Symantec Corp.
25.	Linda Xu	2014	Knobbe, Martens, Olson & Bear
26.	Haichen Liu	2014	Microsoft
27.	Mingzhe Hao	2013	PhD student @ UChicago

**BS/MS Students:**

28.	Joseph Ellis	2015	Palantir
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**Undergraduate Students:**

29.	Max Demers	2018	
30.	Harry Wang	2016	(Facebook)
31.	Sonja Li	2016	
32.	Nora Sandler	2014	Security Innovation
33.	Shankara Pailoor	2014	

**PhD Dissertation Defense Committee:**

2017: Tanakorn Leesatapornwongsa

**PhD Candidacy Exam Committee:**

2018: Fan Yang, Harper Zhang

2017: Harper Zhang

2016: Aiman Fang, Tanakorn Leesatapornwongsa

**Master Thesis Committee (PhD Program):**

2018: Guangpu Li, Shu Wang

2017: Bernard Dickens

2016: Anne Farrell, Haopeng Liu, Yuxi Chen, Yun Li, Jeremy Archer, Shiqin Yan, Michael Tong, Mingzhe Hao

2015: Aiman Fang, Amirali Shambayati, Harper Zhang, Saeid Barati, Riza Suminto

2014: Tanakorn Leesatapornwongsa

*Last updated: April 3, 2018*