

# RAMNATHAN ALAGAPPAN

ASSISTANT PROFESSOR  
DEPARTMENT OF COMPUTER SCIENCE  
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Curriculum Vitae - February 18, 2025

ADDRESS 201 N Goodwin Ave, # 3122  
Urbana, IL 61801

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## CURRENT APPOINTMENTS

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### Assistant Professor

University of Illinois Urbana-Champaign

Aug 2022 – Current

## EDUCATION

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### Ph.D. in Computer Sciences

University of Wisconsin – Madison

2019

Advisors: Andrea C. Arpaci-Dusseau and Remzi H. Arpaci-Dusseau

Thesis: Protocol- and Situation-Aware Distributed Storage Systems

### M.S. in Computer Sciences

University of Wisconsin – Madison

2018

### B.Tech in Information Technology

Coimbatore Institute of Technology, Anna University, India

2010

## HONORS & AWARDS

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|                 |   |             |
|-----------------|---|-------------|
| <b>Research</b> | Best Paper Award at SOSP  | 2024        |
|                 | NetApp Faculty Fellowship   | 2024        |
|                 | NSF CAREER Award  | 2023        |
|                 | Best Paper Award at FAST  | 2020        |
|                 | UW CS Graduate Student Research Award - Best Thesis - Honorable Mention   | 2019        |
|                 | Best Paper Award at FAST  | 2018        |
|                 | Best Paper Award at FAST  | 2017        |
|                 | Best Paper Nominee at FAST  | 2017        |
| <b>Teaching</b> | UIUC List of Teachers Ranked as Outstanding (for CS598 - Storage Systems) | Fall 2023   |
|                 | UIUC List of Teachers Ranked as Excellent (for CS598 - Storage Systems)   | Spring 2023 |
|                 | UIUC List of Teachers Ranked as Excellent (for CS598 - Storage Systems)   | Fall 2022   |
|                 | CS 739 ranked 1st among all courses in student evaluations                | 2020        |
|                 | Nominated for SACM CoW Teaching Award for CS 739                          | 2020        |
| <b>Service</b>  | Distinguished Reviewer at HotStorage                                      | 2021        |
|                 | Best Shadow PC Reviewer at EuroSys  | 2019        |
| <b>Grants</b>   | NetApp Faculty Fellowship   | 2023        |
|                 | NSF Career Award \$699,655  | 2023        |
|                 | Co-PI IIDAI IBM grant \$480,000   | 2023        |
|                 | Microsoft Azure Credits Research Award for \$50,000                       | 2019        |
|                 | Facebook Distributed Systems Research Award for \$50,000                  | 2019        |
|                 | CS Alumni Scholarship, University of Wisconsin – Madison                  | 2013        |

## PEER-REVIEWED PUBLICATIONS

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### Post PhD Work:

- SOSP '24 31. Xuhao Luo, Shreesha Bhat, Jiyu Hu, **Ramnatthan Alagappan**, Aishwarya Ganesan. *LazyLog: A New Shared Log Abstraction for Low-Latency Applications*. In Proceedings of the 30th ACM Symposium on Operating Systems Principles, 2024. Acceptance rate: 43/245 = 17.6%  
**Best Paper Award**  
**Invited to Transactions on Computer Systems**
- ;login: 30. Xudong Sun, Wenqing Luo, Tyler Gu, Aishwarya Ganesan, **Ramnatthan Alagappan**, Michael Gasch, Lalith Suresh, and Tianyin Xu. *Sieve: Chaos Testing for Kubernetes Controllers*. ;login: The USENIX Magazine, November 2024.  
**Invited**
- FAST '24 29. Yi Xu\*, Henry Zhu\*, Prashant Pandey, Alex Conway, Rob Johnson, Aishwarya Ganesan, **Ramnatthan Alagappan**. *IONIA: Efficient Replication for Disk-based KV Stores*. \* = equal contribution. (To Appear) In Proceedings of the 22nd USENIX Conference on File and Storage Technologies, 2024. Acceptance rate: 22/123 = 17.8%
- EuroSys '24 28. Xuhao Luo, **Ramnatthan Alagappan**, Aishwarya Ganesan. *SplitFT: Fault Tolerance for Disaggregated Datacenters via Remote Memory Logging*. In Proceedings of the European chapter of ACM SIGOPS, Athens, Greece. April 2024. Acceptance rate: 71/484 = 14.7%
- CACM 27. **Ramnatthan Alagappan**, Peter Alvaro. *Crash Consistency*. Communications of the ACM - Vol. 66 No. 1, January 2023.  
**Invited**
- TOS '22 26. Aishwarya Ganesan, **Ramnatthan Alagappan**, Anthony Rebello, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Exploiting Nil-External Interfaces for Fast Replicated Storage*. ACM Transactions on Storage (TOS), May 2022.  
**Fast-tracked**
- OSDI '22 25. Xudong Sun, Wenqing Luo, Tyler Gu, Aishwarya Ganesan, **Ramnatthan Alagappan**, Michael Gasch, Lalith Suresh, and Tianyin Xu. *Automatic Reliability Testing For Cluster Management Controllers*. In Proceedings of the 16th USENIX Symposium on Operating Systems Design and Implementation, 2022. Acceptance rate: 49/251 = 19.5%
- SOSP '21 24. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Exploiting Nil-Externality for Fast Replicated Storage*. In Proceedings of the 28th ACM Symposium on Operating Systems Principles, 2021. Acceptance rate: 54/348 = 15.5%  
**Invited to Transactions on Storage**
- NVMW '21 23. Kan Wu, Zhihan Guo, Guanzhou Hu, Kaiwei Tu, **Ramnatthan Alagappan**, Rathijit Sen, Kwanghyun Park, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *The Storage Hierarchy is Not a Hierarchy: Optimizing Caching on Modern Storage Devices with Orthus Non-volatile Memory Workshop*, 2021.
- TOS '21 22. Anthony Rebello, Yuvraj Patel, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Can Applications Recover from fsync Failures?* ACM Transactions on Storage (TOS), June 2021.  
**Fast-tracked**
- TOS '21 21. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Strong and Efficient Consistency with Consistency-aware Durability*. ACM Transactions on Storage (TOS), January 2021.  
**Fast-tracked**

- HotOS '21** 20. Xudong Sun, Lalith Suresh, Aishwarya Ganesan, **Ramnatthan Alagappan**, Michael Gasch, Lilia Tang, Tianyin Xu. *Reasoning about Modern Datacenter Infrastructures using Partial Histories* 18h Workshop on Hot Topics in Operating Systems, 2021.
- FAST '21** 19. Kan Wu, Zhihan Guo, Guanzhou Hu, Kaiwei Tu, **Ramnatthan Alagappan**, Rathijit Sen, Kwanghyun Park, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *The Storage Hierarchy is Not a Hierarchy: Optimizing Caching on Modern Storage Devices with Orthus*. In Proceedings of the 19th USENIX Conference on File and Storage Technologies, 2021. Acceptance rate: 28/130 = 21.5%
- OSDI '20** 18. Yifan Dai, Yien Xu, Aishwarya Ganesan, **Ramnatthan Alagappan**, Brian Kroth, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *From Wisckey to Bourbon: A Learned Index for Log-structured Merge Trees*. In Proceedings of the 14th USENIX Conference on Operating Systems Design and Implementation, 2020. Acceptance rate: 70/398 = 17.6%
- HotStor '20** 17. Konstantinos Kanellis, **Ramnatthan Alagappan**, Shivaram Venkataraman. *Too Many Knobs to Tune? Towards Faster Database Tuning by Pre-selecting Important Knobs*. 12th Workshop on Hot Topics in Storage and File Systems, 2020.
- ATC '20** 16. Anthony Rebello, Yuvraj Patel, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *Can Applications Recover from Fsync Failures?* In Proceedings of the 2020 USENIX Annual Technical Conference, 2020. Acceptance rate: 65/348 = 18.7%  
**Fast-tracked to Transactions on Storage**
- FAST '20** 15. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *Strong and Efficient Consistency with Consistency-aware Durability*. In Proceedings of the 18th USENIX Conference on File and Storage Technologies, 2020. Acceptance rate: 23/138 = 16.7%  
**Best Paper Award**  
**Fast-tracked to Transactions on Storage**

### PhD Work:

- TOS '18** 14. **Ramnatthan Alagappan**, Aishwarya Ganesan, Eric Lee, Aws Albarghouthi, Vijay Chidambaram, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *Protocol-Aware Recovery for Consensus-Based Distributed Storage*. ACM Transactions on Storage (TOS), October 2018.  
**Fast-tracked**
- OSDI '18** 13. **Ramnatthan Alagappan**, Aishwarya Ganesan, Jing Liu, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *Fault Tolerance, Fast and Slow: Exploiting Failure Asynchrony in Distributed Systems*. In Proceedings of the 13th USENIX Conference on Operating Systems Design and Implementation, 2018. Acceptance rate: 47/257 = 18.3%
- FAST '18** 12. **Ramnatthan Alagappan**, Aishwarya Ganesan, Eric Lee, Aws Albarghouthi, Vijay Chidambaram, Andrea C. Arpaci-Dusseu, Remzi H. Arpaci-Dusseu. *Protocol-Aware Recovery for Consensus-Based Storage*. In Proceedings of the 16th USENIX Conference on File and Storage Technologies, 2018. Acceptance rate: 23/140 = 16.4%  
**Best Paper Award**  
**Fast-tracked to Transactions on Storage**  
**Invited to ATC 19 Best of the Rest**
- EUROSys'17** 11. Amir Saman Memaripour, Anirudh Badam, Amar Phanishayee, Yanqi Zhou, **Ramnatthan Alagappan**, Karin Strauss, Steven Swanson. *Atomic In-Place Updates for Non-Volatile Main Memories with KaminoTx*. In Proceedings of the European Conference on Computer Systems, 2017. Acceptance rate: 41/200 = 20.5%

- FAST '17** 10. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Redundancy Does Not Imply Fault Tolerance: Analysis of Distributed Storage Reactions to Single Errors and Corruptions*. In Proceedings of the 15th USENIX Conference on File and Storage Technologies, 2017. Acceptance rate: 28/118 = 23.7%  
**Best Paper Nominee**  
**Invited to Usenix ;login:**  
**Fast-tracked to Transactions on Storage**
- FAST '17** 9. Thanumalayan Sankaranarayana Pillai, **Ramnatthan Alagappan**, Lanyue Lu, Vijay Chidambaram, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Application Crash Consistency and Performance with C2FS*. In Proceedings of the 15th USENIX Conference on File and Storage Technologies, 2017. Acceptance rate: 28/118 = 23.7%  
**Best Paper Award**  
**Fast-tracked to Transactions on Storage**  
**Invited to ATC 18 Best of the Rest**
- ;login:** 8. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Redundancy Does Not Imply Fault Tolerance: Analysis of Distributed Storage Reactions to Single Errors and Corruptions*. ;login: The USENIX Magazine, Summer 2017.  
**Invited**
- TOS '17** 7. Aishwarya Ganesan, **Ramnatthan Alagappan**, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Redundancy Does Not Imply Fault Tolerance: Analysis of Distributed Storage Reactions to File-System Faults*. ACM Transactions on Storage (TOS), September 2017.  
**Fast-tracked**
- TOS '17** 6. Thanumalayan Sankaranarayana Pillai, **Ramnatthan Alagappan**, Lanyue Lu, Vijay Chidambaram, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Application Crash Consistency and Performance with C2FS*. ACM Transactions on Storage (TOS), September 2017.  
**Fast-tracked**
- OSDI '16** 5. **Ramnatthan Alagappan**, Aishwarya Ganesan, Yuvraj Patel, Thanumalayan Sankaranarayana Pillai, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Correlated Crash Vulnerabilities*. In Proceedings of the 12th USENIX Conference on Operating Systems Design and Implementation, 2016. Acceptance rate: 47/267 = 17.6%
- HorOs '15** 4. **Ramnatthan Alagappan**, Vijay Chidambaram, Thanumalayan Sankaranarayana Pillai, Aws Albarghouthi, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Beyond Storage APIs: Provable Semantics for Storage Stacks*. 15th Workshop on Hot Topics in Operating Systems, 2015.
- ACMQueue** 3. Thanumalayan Sankaranarayana Pillai, Vijay Chidambaram, **Ramnatthan Alagappan**, Samer Al Kiswany, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Crash Consistency: Rethinking the Fundamental Abstractions of the File System*. ACM Queue, July 2015.  
**Invited**
- CACM** 2. Thanumalayan Sankaranarayana Pillai, Vijay Chidambaram, **Ramnatthan Alagappan**, Samer Al Kiswany, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Crash Consistency*. Communications of the ACM - Vol. 58, No. 10, October 2015.  
**Invited**
- OSDI '14** 1. Thanumalayan Sankaranarayana Pillai, Vijay Chidambaram, **Ramnatthan Alagappan**, Samer Al Kiswany, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *All File Systems Are Not Created Equal: On the Complexity of Crafting Crash-Consistent Applications*. In Proceedings of the 11th USENIX Conference on Operating Systems Design and Implementation, 2014. Acceptance rate: 42/232 = 18.1%  
**Invited to Communications of the ACM**  
**Invited to ACM Queue**

## RESEARCH IMPACT

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**Corruption-tolerant Replication.** The CTRL protocol from my FAST '18 paper has been adopted and implemented in TigerBeetle ([Link1](#), [Link2](#)), a financial database, making it resilient to storage corruptions and errors. This work has also influenced systems at Facebook ([Link](#)).

**ErrFS and ErrBench.** ErrFS is a user-level FUSE file system that systematically injects file-system faults. Ideas from ErrFS have been adopted by other popular testing tools. ErrBench is a suite of distributed-storage-system workloads which drives systems to interact with their local storage. Through ErrFS and ErrBench, we have exposed many serious bugs in popular distributed systems such as ZooKeeper, Cassandra, and Kafka.  
[Link to Artifacts](#)

**PACE.** PACE is a framework to systematically generate and explore persistent states that can occur in a distributed execution, exposing crash vulnerabilities in distributed storage systems. PACE found 26 serious, real-world bugs in popular systems including ZooKeeper, Redis, etcd, and Kafka. Many bugs found by PACE have been fixed by developers.  
[Link to Artifacts](#)

**ALICE.** ALICE is a crash-consistency testing framework that I helped build. ALICE has been adopted by others (including an open-source version). ALICE found several real-world bugs in 12 widely used commercial storage software products, including Google's LevelDB, Git, and SQLite.  
[Link](#)

## PRESS ARTICLES ON RESEARCH

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|   |          |
|---|----------|
| THE MORNING PAPER. Protocol-Aware Recovery for Consensus-Based Storage<br><a href="#">Link to Article</a> | Feb 2018 |
| ZDNET. Eliminating Storage Failures in the Cloud<br><a href="#">Link to Article</a>                       | Feb 2018 |
| THE MORNING PAPER. Crash Consistency and Performance with CCFS<br><a href="#">Link to Article</a>         | Mar 2017 |
| THE MORNING PAPER. Redundancy Does Not Imply Fault Tolerance<br><a href="#">Link to Article</a>           | Mar 2017 |
| DHSR's BLOG. Redundancy Does Not Imply Fault Tolerance<br><a href="#">Link to Article</a>                 | Mar 2017 |
| STORAGEMOJO. Redundancy Does Not Imply Fault Tolerance<br><a href="#">Link to Article</a>                 | Mar 2017 |
| THE MORNING PAPER. All File Systems are Not Created Equal<br><a href="#">Link to Article</a>              | Feb 2016 |

## TEACHING

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|  |            |
|--|------------|
| Instructor, UIUC<br>CS 598 - Cloud Storage Systems<br><b>UIUC List of Teachers Ranked as Outstanding</b> | FALL '23   |
| Instructor, UIUC<br>CS 598 - Cloud Storage Systems<br><b>UIUC List of Teachers Ranked as Excellent</b>   | SPRING '23 |
| Instructor, UIUC   |            |

## STUDENT ADVISING

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**Henry Zhu**, PhD student

*Started Fall 2022*

**Xuhao Luo**, PhD student

*Started Fall 2022*

**Shreesha Bhat**, PhD student

*Started Fall 2023*

**Jiyu Hu**, PhD student

*Started Fall 2023*

**Kiran Hombal**, PhD student

*Started Fall 2023*

**Seokjoo Cho**, PhD student

*Started Fall 2024*

**Emaan Attique**, PhD student

*Started Spring 2025*

**Wenqing Luo**, MS student (graduated)

*Cloud-Native Recoverability*

**Chaitanya Bhandari**, MS student (graduated)

**Ramya Bygari**, MS student (graduated)

## SERVICE

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|                                  |      |
|----------------------------------|------|
| EuroSys '26 Program Committee    | 2026 |
| FAST '26 Program Committee       | 2026 |
| SOSP '25 Program Committee       | 2025 |
| FAST '25 Program Committee       | 2025 |
| SYSTOR '25 Program Committee     | 2025 |
| HotStorage '25 Program Committee | 2025 |
| USENIX ATC '25 Program Committee | 2025 |
| PaPoC '25 Program Committee      | 2025 |
| SOCC '25 Program Committee       | 2025 |
| NSDI '25 Program Committee       | 2025 |
| SysDW '24 Co-Chair               | 2024 |
| ICDCS '24 Track Co-Chair         | 2024 |
| SOSP '24 Program Committee       | 2024 |
| USENIX ATC '24 ERC Co-Chair      | 2024 |
| USENIX ATC '24 Program Committee | 2024 |

|  |      |
|--|------|
| EuroSys '24 Program Committee                                      | 2024 |
| HotStorage '24 Program Committee                                   | 2024 |
| SYSTOR '24 Program Committee                                       | 2024 |
| Performance '23 Program Committee                                  | 2023 |
| SYSTOR '23 Program Committee                                       | 2023 |
| NVMW '23 Program Committee   | 2023 |
| SOCC '23 Program Committee   | 2023 |
| HotStorage '23 Program Committee                                   | 2023 |
| OSDI '23 Program Committee   | 2023 |
| FAST '23 Poster/WiP Co-chair                                       | 2023 |
| SRC PACT '22 Program Committee                                     | 2022 |
| SOCC '22 Program Committee   | 2022 |
| HotStorage '22 Program Committee                                   | 2022 |
| SOSP '21 Ask-Me-Anything Co-chair                                  | 2021 |
| SOSP '21 Mentoring   | 2021 |
| OSDI '21 Mentoring   | 2021 |
| EuroDW '21 Mentoring   | 2021 |
| Journal of Systems SEB Co-chair                                    | 2021 |
| EuroDW '21 Program Committee                                       | 2021 |
| HotStorage '21 Program Committee ( <b>Distinguished Reviewer</b> ) | 2021 |
| Systor '21 Program Committee                                       | 2021 |
| ACM Transactions on Computer Systems, Reviewer                     | 2020 |
| HotStorage '20 Program Committee                                   | 2020 |
| SOSP '19 Artifact Evaluation Committee                             | 2019 |
| Eurosys '19 Shadow PC ( <b>Best Reviewer</b> )                     | 2019 |
| ACM Transactions on Storage, Reviewer                              | 2018 |
| FAST '18, External Reviewer  | 2018 |
| EuroSys '17, Contributor to PC Reviews                             | 2017 |
| OSDI '16, External Reviewer  | 2016 |
| FAST '16, External Reviewer  | 2016 |

## PRESENTATIONS & INVITED TALKS

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### New Log Abstractions for Datacenter Applications

University of California, Berkeley

University of Pennsylvania

Oct '24

Nov '24

|   |         |
|---|---------|
| <b>Co-designing Distributed Systems and Storage Stacks for Improved Reliability</b> |         |
| University of Waterloo  | JAN '22 |
| Virginia Tech   | JAN '22 |
| Pennsylvania State University   | FEB '22 |
| University of Virginia  | FEB '22 |
| Purdue University   | FEB '22 |
| University of Utah  | FEB '22 |
| University of Toronto   | MAR '22 |
| University of Illinois at Urbana-Champaign  | MAR '22 |
| University of Washington  | MAR '22 |
| University of Michigan  | MAR '22 |
| Massachusetts Institute of Technology   | MAR '22 |
| University of North Carolina at Chapel Hill   | MAR '22 |
| University of Southern California   | MAR '22 |
| University of California, Santa Cruz  | MAR '22 |
| University of California, Irvine  | APR '22 |
| <b>Co-designing Distributed Systems and Storage Stacks</b>                          |         |
| University of Waterloo (invited)  | OCT '21 |
| <b>Reliable Distributed Storage: A Local-storage Perspective</b>                    |         |
| Rutgers University (invited)  | AUG '20 |
| <b>Reliable Distributed Storage: A Local-storage Perspective</b>                    |         |
| VMware Research Group (postdoc interview talk)                                      | JUN '20 |
| <b>Protocol-Aware Recovery for Consensus-Based Storage</b>                          |         |
| Usenix ATC (invited conference talk)  | JUL '19 |
| <b>Storage Systems at the Edge</b>  |         |
| NSF-VMWare ECDI Summit (invited)  | Nov '18 |
| <b>Fault-Tolerance, Fast and Slow</b>   |         |
| Usenix OSDI (conference talk)   | OCT '18 |
| <b>Protocol-Aware Recovery for Consensus-Based Storage</b>                          |         |
| SNIA Storage Developer Conference (invited)   | SEP '18 |
| <b>Resiliency to Storage Faults in Distributed Systems</b>                          |         |
| Google Madison (invited)  | MAY '18 |
| <b>Protocol-Aware Recovery for Consensus-Based Storage</b>                          |         |
| Usenix FAST (conference talk)   | FEB '18 |
| <b>Rethinking Consensus with Local Storage in Mind</b>                              |         |
| SCI Labs Kickoff Meeting  | MAY '17 |
| <b>Correlated Crash Vulnerabilities</b>   |         |
| Usenix OSDI (conference talk)   | OCT '16 |
| <b>Correlated Crash Vulnerabilities</b>   |         |
| Microsoft Gray Systems Lab (invited)  | JUN '16 |