Aishwarya Ganesan

Postdoctoral Researcher
VMware Research

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Research Summary

I am a computer systems researcher. Computer systems underpin every modern application that we interact with today. When designing systems, one must often tradeoff strong guarantees for performance or vice-versa. *My goal is to ensure that computer systems enable applications to realize both correctness and high performance.* My research so far has focused on resolving the tension between correctness and performance in distributed storage systems. *My work rethinks fundamental problems to build new distributed storage systems that provide strong consistency and reliability guarantees yet also perform well.*
My vision is to build the next-generation systems for emerging hardware (e.g., smartNICs and smartSSDs) and deployment scenarios (e.g., the edge). In particular, my goal is to ensure that these future systems satisfy the demanding requirements of modern applications while achieving high performance.

Current Employment

☐ **VMware Research** — Palo Alto, CA
Postdoctoral Researcher — Oct '20 –

Education

☐ **University of Wisconsin – Madison**
Ph.D. in Computer Sciences — 2015–2020
Advisors: Andrea Arpaci-Dusseau and Remzi Arpaci-Dusseau

☐ **Indian Institute of Technology Bombay**
M.Tech in Computer Science and Engineering — 2011–2013
Advisor: S. Sudarshan

☐ **Coimbatore Institute of Technology, Anna University**
B.Tech in Information Technology — 2006–2010

Honors & Awards

☐ **Selected for Rising Stars in EECS '21** — 2021

☐ **Graduate Student Instructor Award** — 2020
For teaching graduate-level distributed systems at UW Madison

☐ **FAST Best Paper Award** — 2020
For our paper *Consistency-Aware Durability*

☐ **Facebook Ph.D., Fellowship** — 2019-2020
Fellowship in distributed systems; funding towards tuition, stipend, and travel.

☐ **Facebook Distributed Systems Research Award for $50,000** — 2020
Jointly with Ramnatthan Alagappan, Andrea Arpaci-Dusseau, and Remzi Arpaci-Dusseau

☐ **CS Department Golden Brick Award** — 2019
For leading diversity efforts as president of UW Madison chapter of ACM-W

☐ **Selected for Rising Stars in EECS '18** — 2018

☐ **FAST Best Paper Award** — 2018
For our paper *Protocol-Aware Recovery*

- ☐ **Grace Hopper Celebration of Women in Computing Scholarship** 2017
- ☐ **FAST Best Paper Award Nominee** 2017
  For our paper *Redundancy Does Not Imply Fault-Tolerance*
- ☐ **Departmental Research Fellowship, University of Wisconsin – Madison** 2015
- ☐ **Department Gold Medal** 2010
  For ranking first during undergraduate studies
- ☐ **Tata Consultancy Services endowed Best Student Award** 2010

Peer-Reviewed Conference Publications

[1] **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, October 2021. (Acceptance rate: 54/348 = 15.5%) **SOSP '21**
Invited for fast-tracked publication in ACM Transactions on Storage

[2] Yifan Dai, Yien Xu, **Aishwarya Ganesan**, Ramnatthan Alagappan, Brian Kroth, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *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%) **OSDI '20**
Invited to Workshop on Learned Algorithms, Data Structures, and Instance-Optimized Systems @ VLDB '21

[3] **Aishwarya Ganesan**, Ramnatthan Alagappan, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Strong and Efficient Consistency with Consistency-aware Durability.* In Proceedings of the 18th Conference on File and Storage Technologies, February 2020. (Acceptance rate: 23/138 = 16.7%) **FAST '20**
Best Paper Award
Invited for fast-tracked publication in ACM Transactions on Storage

[4] Iyswarya Narayanan, **Aishwarya Ganesan**, Anirudh Badam, Sriram Govindan, Bikash Sharma, Anand Sivasubramaniam. *Getting More Performance with Polymorphism from Emerging Memory Technologies.* In Proceedings of the 12th ACM International Conference on Systems and Storage, June 2019. (Acceptance rate: 16/44 = 36.4%) **SYSTOR '19**

[5] Ramnatthan Alagappan, **Aishwarya Ganesan**, Jing Liu, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *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%) **OSDI '18**

[6] Ramnatthan Alagappan, **Aishwarya Ganesan**, Eric Lee, Aws Albarghouthi, Vijay Chidambaram, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Protocol-Aware Recovery for Consensus-Based Storage.* In Proceedings of the 16th USENIX Conference on File and Storage Technologies, February 2018. (Acceptance rate: 23/140 = 16.4%) **FAST '18**
Best Paper Award
Best of the Rest at ATC '19
Invited for fast-tracked publication in ACM Transactions on Storage

[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 Single Errors and Corruptions.* In Proceedings of the 15th USENIX Conference on File and Storage Technologies, 2017. (Acceptance rate: 28/118 = 23.7%) **FAST '17**
Best Paper Nominee
Invited for fast-tracked publication in ACM Transactions on Storage
Invited to USENIX ;login:

[8] 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, November 2016. (Acceptance rate: 47/267 = 17.6%) **OSDI '16**

[9] Swati Rallapalli, **Aishwarya Ganesan**, Krishna Chintalapudi, Venkat Padmanabhan, Lili Qiu. *Enabling Physical Analytics in Retail Stores using Smart Glasses.* In Proceedings of the 20th Annual International Conference on Mobile Computing and Networking, September 2014. (Acceptance rate: 36/220 = 16.4%) **MobiCom '14**

Peer-Reviewed Journal and Workshop Publications & Demos

[1] Xudong Sun, Lalith Suresh, **Aishwarya Ganesan**, Ramnatthan Alagappan, Michael Gasch, Lilia Tang, and Tianyin Xu. *Reasoning About Modern Datacenter Infrastructures using Partial Histories.* In Proceedings of the Workshop on Hot Topics in Operating Systems, June 2021. **HotOS '21**

[2] **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), 17(1), January 2021. (***Fast-tracked***) **ACM TOS '21**

[3] Ramnatthan Alagappan, **Aishwarya Ganesan**, Eric Lee, Aws Albarghouthi, Vijay Chidambaram, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. *Protocol-Aware Recovery for Consensus-Based Distributed Storage.* ACM Transactions on Storage (TOS), 14(3), October 2018. (***Fast-tracked***) **ACM TOS '18**

[4] **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), 13(3), September 2017. (***Fast-tracked***) **ACM TOS '18**

[5] **Aishwarya Ganesan**, Swati Rallapalli, Krishna Chintalapudi, Venkat Padmanabhan, Lili Qiu. *Demo: Tracking User Browsing on a Demo Floor*, In Proceedings of the 20th Annual International Conference on Mobile Computing and Networking, September 2014. **MobiCom '14**

Other Publications

[1] **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, 42(2), Summer 2017. (***Invited***) **;login:**

[2] Rajalakshmi Nandakumar, Swati Rallapalli, Krishna Chintalapudi, Venkat Padmanabhan, Lili Qiu, **Aishwarya Ganesan**, Saikat Guha, Deepanker Aggarwal, Aakash Goenka. *Physical Analytics: A New Frontier for (Indoor) Location Research.* Microsoft Technical Report no. MSR-TR-2013-107, October 2013. **Tech Report**

Coverage On Research

- ☐ The Morning Paper. Protocol-Aware Recovery for Consensus-Based Storage (link). Feb 2018
- ☐ ZDNet. Eliminating storage failures in the cloud (link). Feb 2018
- ☐ The Morning Paper. Redundancy does not imply fault tolerance (link). Mar 2017
- ☐ DHSR's Blog. Injecting Faults in Distributed Storage (link). Mar 2017
- ☐ StorageMojo. StorageMojo's Best Paper of FAST 2017 (link). Mar 2017

Grants

- Travel grants for FAST '17, FAST '18
- Facebook Distributed Systems ***Research Award for $50,000*** (along with Ramnatthan Alagappan, Prof. Andrea Arpaci-Dusseau, and Prof. Remzi Arpaci-Dusseau)

Prior Work Experience

- **Microsoft Research** — Redmond, WA
  Research Intern, Systems Research Group — Summer '17
  Mentor: Anirudh Badam

- **Microsoft Research** — Bangalore, India
  Research Fellow, Mobility, Networks, and Systems Group — Jul '13 – Apr '15
  Mentors: Krishna Chintalapudi and Venkat Padmanabhan

- **United Online Software Development Limited** — Hyderabad, India
  Software Engineer — Jul '10 – Jun '11

Teaching

- **Distributed Systems**, *University of Wisconsin – Madison*
  Instructor — Spring '20
  Course webpage
  Graduate Student Instructor Award
  Course evaluation score: instructor – ***6.42/7***, course – ***6.5/7***
- **Distributed Systems**, *University of Wisconsin – Madison*
  Guest Lectures — Fall '18, Fall '17
- **Design and Analysis of Algorithms**, *Indian Institute of Technology, Bombay*
  Teaching Assistant — Spring '13
- **Implementation Techniques of DBMS**, *Indian Institute of Technology, Bombay*
  Teaching Assistant — Fall '12

Research Mentoring

- **Yi Xu (graduate student at UC San Diego)**
  Exploiting persistent memory in modern key-value stores (internship at VMware Research)
- **Yifan Dai, Yien Xu**
  Learned indexes for log-structured merge trees (CS 739 course project, OSDI 2020)
- **Sreya Dutta Roy, Nikita Kad, Venkat Allam, Shreeshrita Patnaik**
  Predicted ordering in geo-replicated logs (CS 739 course project)
- **Akshat Jain, Grishma Gupta, Venkata Malireddy**
  Learning based ordering for replicated state machines (CS 739 course project)
- **Deepak Srinath, Lokit Kumar Paras, Nithin Venkatesh, Phanindra Moganti**
  Speculative geo-replicated message ordering (CS 739 course project)
- **Ruohui Wang, Kaiwei Tu, Max Zhang, Emma He**
  Read-trigerred durability for HDFS (CS 739 course project)
- **Muthunagappan Muthuraman, Srivatsan Ramesh, Suryadev Sahadevan Rajesh, Vinith Venkatesan**
  Consistency-aware durability for highly available systems (CS 739 course project)
- **Aashish Richhariya, Akanksha, Sanchit Jain**
  Consistency at the edge (CS 739 course project)

- **Dax Chen, Yi-Shiun Chang, Chia-Wei Chen, Pei-Hsuan Wu**
  Performance and reliability isolation in ZooKeeper (CS 739 course project)
- **Kumar Biplav, Aditya Rungta, Nisarg Shah, Shaurya Shekhar**
  Fast consensus for fast storage (CS 739 course project)
- **Neil Perry (undergrad at UW Madison)**
  Corruption analysis of Ethereum blockchain (now a graduate student at Stanford)

Service

- **Chair**
  - SOSP '21 AMA Co-chair — 2021
  - Journal of Systems Research, Student Editorial Board Co-chair — 2021
  - Founded and organized graduate student research symposium at UW Madison — 2019
- **Program Committee Member**
  - HotStorage '22, Program Committee Member — 2022
  - APSys '21, Program Committee Member — 2021
  - SYSTOR '21, Program Committee Member — 2021
  - HAOC '21 (co-organized with EuroSys '21), Program Committee Member — 2021
  - EuroDW '21 (co-organized with EuroSys '21), Program Committee Member — 2021
- **External Reviewer and Shadow PC Member**
  - FAST, External Reviewer — 2021
  - NVMW, External Reviewer — 2020
  - ACM Transactions on Storage, Reviewer — 2019
  - EuroSys, Shadow PC Member — 2019
  - FAST, External Reviewer — 2018
  - EuroSys, Contributor to PC Reviews — 2017
  - OSDI, External Reviewer — 2016
- **Outreach**
  - SOSP '21 Mentoring — 2021
  - OSDI '21 Mentoring — 2021
  - EuroDW '21 Mentoring — 2021
  - President, W-ACM, UW Madison chapter of ACM's Women in Computing — 2018–2019
  - UW Madison CS department outreach at Grace Hopper Conference career fair — 2018
  - WACM Graduate Student Mentor (for women undergraduate and graduate students) — 2017

Invited Talks and Presentations

- **Exploiting Nil-Externality for Fast Replicated Storage**
  Talk at SOSP '21 — Oct '21

☐ **From Wisckey to Bourbon: A Learned Index for Log-structured Merge Trees**
Invited talk at Workshop on Learned Algorithms, Data Structures, and Instance-Optimized (co-organized with VLDB '21) — Aug '21

☐ **Consistency and Performance in Distributed Storage Systems**
Invited talk at University of Waterloo — Jun '21
Invited talk at Rutgers University — Oct '20
Invited talk at VMware Research — Jun '20

☐ **Strong and Efficient Consistency with Consistency-aware Durability**
Microsoft — Aug '20
VMWare Tech Talk — Mar '20
Talk and Poster at FAST — Feb '20

☐ **A Measure-then-Build Approach to Distributed Storage Reliability**
Talk at Facebook Research Women in Research Lean In event — Sep '19
Poster at Facebook Research Fellowship and Emerging Scholars Summit — Sep '19
Poster at Rising Stars in EECS, MIT — Oct '18

☐ **Fault Analysis of Scalable Distributed Storage**
Talk at SCI Labs Kick-off Meeting — Apr '17

☐ **Redundancy Does Not Imply Fault Tolerance**
Invited talk at Hydra '20 — Jul '20
Poster at SCI Labs Kick-off Meeting — Apr '17
Talk and Poster at FAST — Mar '17
Invited Poster at NetApp University Day — Feb '17

☐ **Correlated Crash Vulnerabilities**
Poster at OSDI — Nov '17
Talk at Microsoft Gray Systems Lab — Jun '16

☐ **Tracking User Browsing on a Demo Floor**
Invited Demo and Poster at Microsoft Research's TechVista — Jan '15
Invited Demo and Poster at COMSNETS — Jan '15
Demo and Poster at MobiCom — Sep '14

References

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