Chenhao Ye

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Education

Ph.D. student in Computer Science, University of Wisconsin–Madison — Madison, WI, Sep 2020 – May 2026 (expected)
- Advisors: Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau
- Research Interests: AI Infrastructure, Storage Systems, Distributed Systems, Databases

M.S. in Computer Science, University of Wisconsin–Madison — Madison, WI, Sep 2020 – Aug 2025
- GPA: 4.00 / 4.00

B.S. in Computer Science, University of Wisconsin–Madison — Madison, WI, Jan 2019 – Aug 2020
- GPA: 4.00 / 4.00, Graduated with Honors

B.S. in Electrical and Computer Engineering, Shanghai Jiao Tong University — Shanghai, China, Sep 2016 – Dec 2018
- GPA: 3.73 / 4.00 — *remote*, May 2021 – Dec 2021

Work Experience

ByteDance, Seed Training Infrastructure — *Student Researcher* · San Jose, CA, May 2025 – Dec 2025
- Proposed *Reference-Oriented Storage* (ROS), a new storage architecture for LLM reinforcement learning (RL) that enables efficient peer-to-peer data sharing with optimal transfer topology and zero memory redundancy.
- Designed *TensorHub*, a ROS-based system for fault-tolerant, load-balanced weight synchronization in large-scale RL training; its abstraction layer and declarative interfaces simplify synchronization logic, achieving $\sim 30\times$ reduction in lines of code and up to $19\times$ lower GPU stall time.

Microsoft Research, Data Systems Group — *Research Intern* · Redmond, WA, May 2024 – Aug 2024
- Designed *MultiLog*, a novel replication protocol that enables concurrent write-ahead log (WAL) replay with linear scalability, eliminating the sequential bottleneck of traditional WAL replication while preserving consistency.
- Implemented MultiLog on Garnet, a high-performance distributed KV cache-store; the system is now in production and enables scaling from a single cache node to multiple read replicas.

Snowflake, Global Platform Team — *Software Engineer Intern* · San Mateo, CA, May 2023 – Aug 2023
- Prototyped a workload replay tool that generates realistic workloads based on existing job statistics, attracting significant interest from multiple internal customers for benchmarking and resource provisioning purposes.
- Implemented a critical multi-metastore feature that resolved a major blocker for the data ingestion system's deployment.
- Uncovered and fixed a subtle concurrency bug in the data infrastructure that could cause data loss in production.

Research Projects *(selected)*

Cache-Centric Multi-Resource Allocation for Storage Services, Project Leader — Jan 2021 – Dec 2024
- Presented a resource allocation framework for multi-tenant storage systems that leverages the demand correlation between cache sizes and other resources (*e.g.*, I/O, network) to optimize resource utilization while maintaining fairness.
- Developed *HopperKV*, a multi-tenant Redis-based key-value store that caches data from DynamoDB; by judiciously allocating cache sizes among tenants, HopperKV optimizes DynamoDB utilization, achieving up to $1.9\times$ higher throughput.
- Built *BunnyFS*, a multi-tenant local filesystem for high-performance NVMe SSDs; by optimizing page cache allocations among tenants, BunnyFS delivers up to $1.4\times$ higher throughput.

Enabling Transaction Priority in Optimistic Concurrency Control, Project Leader — Oct 2021 – Apr 2023
- Proposed a lightweight reservation mechanism for optimistic concurrency control (OCC) protocol that protects high-priority transactions from being aborted by low-priority transactions in the case of conflicts.
- Designed and implemented *Polaris*, an OCC protocol that supports multiple priority levels; benchmarks show it can achieve up to $1.9\times$ higher throughput and $17\times$ lower latency compared to an existing OCC protocol on high-contention workloads.

MadFS: Per-File Virtualization for Userspace Persistent Memory Filesystems, Project Co-Leader — Oct 2021 – Jan 2023
- Proposed a novel *per-file virtualization* technique for persistent memory filesystems, which encapsulates a set of filesystem functionalities, including metadata management, crash consistency, and concurrency control, fully in userspace; this technique significantly reduces the kernel-crossing overhead on the critical path.
- Built *MadFS*, a kernel-bypassing persistent memory filesystem based on per-file virtualization, achieving up to $1.5\times$ speedup for LevelDB on the YCSB workload and $1.9\times$ for SQLite on the TPC-C workload.

Publications

[1] Chenhao Ye, Shawn Zhong, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. Cache-Centric Multi-Resource Allocation for Storage Services. In *24th USENIX Conference on File and Storage Technologies*. **FAST '26**

[2] Sambhav Satija, Chenhao Ye, Ranjitha Kosgi, Aditya Jain, Romit Kankaria, Yiwei Chen, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Kiran Srinivasan. Cloudscape: A Study of Storage Services in Modern Cloud Architectures. In *23rd USENIX Conference on File and Storage Technologies*. **FAST '25**

[3] Chenhao Ye, Wuh-Chwen Hwang, Keren Chen, Xiangyao Yu. Polaris: Enabling Transaction Priority in Optimistic Concurrency Control. In *Proceedings of the 2023 International Conference on Management of Data*. **SIGMOD '23**

[4] Shawn Zhong*, Chenhao Ye*, Guanzhou Hu, Suyan Qu, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Michael M. Swift. MadFS: Per-File Virtualization for Userspace Persistent Memory Filesystems. In *21st USENIX Conference on File and Storage Technologies*. (*contributed equally) **FAST '23**

[5] Yuvraj Patel, Chenhao Ye, Akshat Sinha, Abigail Matthews, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Michael M. Swift. Using Trāṭr to tame Adversarial Synchronization. In *31st USENIX Security Symposium*. **USENIX Security '22**

[6] Jing Liu, Anthony Rebello, Yifan Dai, Chenhao Ye, Sudarsun Kannan, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau. Scale and Performance in a Filesystem Semi-Microkernel. In *Proceedings of the ACM SIGOPS 28th Symposium on Operating Systems Principles*. **SOSP '21**

Professional Activities

Journal Reviewer:

- *Journal of Computer Science and Technology* (**JCST**).

Artifact Evaluation Committee:

- *ACM Symposium on Operating Systems Principles* (**SOSP '24**)
- *USENIX Symposium on Operating Systems Design and Implementation* (**OSDI '24**, **OSDI '25**, **OSDI '26**)
- *USENIX Annual Technical Conference* (**ATC '24**)
- *USENIX Conference on File and Storage Technologies* (**FAST '24**, **FAST'26**)

Shadow Program Committee:

- *European Conference on Computer Systems* (**EuroSys '26**)