KAN WU

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EDUCATION

Ph.D. in Computer Science, UW-Madison / 2016.09 – 2022.07 (expected)
Advisors: Andrea Arpaci-Dusseau and Remzi Arpaci-Dusseau
Areas: Storage System, Databases (Focus: Persistent Memory, Caching, Multi-tenancy)

M.S. in Computer Science, UW-Madison / 2016 – 2020
B.E. University of Science and Technology of China / 2012 – 2016 Outstanding Graduate

RESEARCH EXPERIENCE

Multi-tenant Persistent Memory Caching (FAST'22)
Developed NyxCache, an access regulation framework for multi-tenant persistent memory caching that supports light-weight access regulation, per-cache resource usage estimation and inter-cache interference analysis. Built important sharing policies such as resource-limiting, QoS-awareness, fair slowdown, and proportional sharing.

Augmenting Classic Caching for Persistent Memory Hierarchies (FAST'21, NVMW'21)
Proposed read-around mechanism and associated policies, a novel approach to automatically augment classic caching to exploit combined-peak (vs. cache device only) performance from modern storage hierarchies with emerging devices (e.g., Optane DC Persistent Memory, Optane SSD, Flash SSD).

Building Search Engines for Tiny Memory and Flash Hierarchies (FAST'20)
Developed WiSer, a search engine that exploits Flash SSDs and tiny main memory. Proposed multiple techniques, including optimized data layout to reduce I/O amplification, a novel two-way Bloom filter to reduce phrase query latencies and adaptive prefetching.

Field-Granularity Caching for PM-based OLTP Databases (In Submission, VLDB'22)
Designed field-granularity caching mechanisms and policies for in-memory relational databases based on DRAM and PM hierarchies.

Performance Characterization of Persistent Memory Devices (HotStorage'19, DaMoN'19)
Formalized guidelines to be followed by the users of Intel Optane SSD (a popular PM-based block device). Examined Optane SSD's internals to provide insights into each rule.

PUBLICATIONS

[1] NyxCache: Flexible and Efficient Multi-tenant Persistent Memory Caching Kan Wu, Kaiwei Tu, Yuvraj Patel, Rathijit Sen, Kwanghyun Park, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau**, FAST'2022**

[2] The Storage Hierarchy is Not a Hierarchy: Optimizing Caching on Modern Storage Devices with Orthus Kan Wu, Zhihan Guo, Guanzhou Hu, Kaiwei Tu, Ramnatthan Alagappan, Rathijit Sen, Kwanghyun Park, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau**, FAST'2021**

[3] Releasing Locks As Early As You Can: Reducing Contention of Hotspots by Violating Two-Phase Locking Zhihan Guo, Kan Wu, Cong Yan, Xiangyao Yu **SIGMOD'2021**

[4] Read as Needed: Building WiSER, a Flash-Optimized Search Engine Jun He, Kan Wu, Sudarsun Kannan, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau, **FAST'2020**

[5] Towards an Unwritten Contract of Intel Optane SSD Kan Wu, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau, **HotStorage'2019**

[6] Exploiting Intel Optane SSD for Microsoft SQL Server Kan Wu,Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Rathijit Sen, Kwanghyun Park, **SIGMOD'2019, DaMoN**

[7] The Storage Hierarchy is Not a Hierarchy: Optimizing Caching on Modern Storage Devices with Orthus Kan Wu, Zhihan Guo, Guanzhou Hu, Kaiwei Tu, Ramnatthan Alagappan, Rathijit Sen, Kwanghyun Park, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau, **NVMW'2021**

[8] (In Sub) Field-granularity Caching for Persistent Memory-based OLTP Databases VLDB'2022

[9] (In Sub) Optimizing Two-Phase Commit for Disaggregated Storage Architecture VLDB'2023

[10] (In Sub) Learned, Segmented, Cache Admission Policy ATC'2022

[11] (In Sub) Scalable Approximate Graph Mining with Pattern Decomposition NSDI'2023

PROFESSIONAL EXPERIENCE

Software Engineering Intern, VMWare / 2019.05 – 2019.08 (vSAN team)
Research Assistant, Microsoft / 2018.09 – 2021.09 (Gray System Lab)
Research Assistant, CUHK / 2016.01 – 2016.05 (Advisor: Patrick Lee)

PROFESSIONAL SERVICES

Shadow PC, Eurosys 2022
Reviewer, ACM Transactions on Storage (TOS) 2021, Journal of Systems Research (JSys) 2021
External Reviewer, FAST 2022, NSDI 2020, FAST 2018

HONORS AND AWARDS

Summer Research Award, UW-Madison / 2017

Outstanding Graduate, USTC / 2016

Winner Algorithm, IEEE Congress on Evolutionary Computation / 2015

Tencent Innovation Scholarship / 2014

SKILLS & RELEVANT COURSEWORK

Programming language: C, C++, Python, Java.

Coursework: operating system, distributed system, computer architecture, database.