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.