Sekwon Lee

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Research Interest

Computer Systems

Storage and File systems, Database Systems, Distributed Systems, Operating Systems

Focus: Persistent Memory (PM) & Far Memory (Disaggregated DRAM/PM) aware systems design

- Designing an elastic and high-performance datastore for far memory architectures
- Designing index structures for PM-based storage systems
- Improving the performance and reliability of PM-based file systems

Education

University of Texas at Austin — *TX, U.S.A*
Ph.D. in Computer Science — *Aug. 2018 - Present*
- Advisor: Vijay Chidambaram

UNIST (Ulsan National Institute of Science and Technology) — *Ulsan, South Korea*
M.S. in Computer Science and Engineering — *Mar. 2016 - Feb. 2018*
- Advisor: Sam H. Noh

Virginia Polytechnic Institute and State University — *VA, U.S.A*
Visiting student — *Mar. 2017 - May 2017*
- Co-research advised by Changhee Jung

Hongik University — *Seoul, South Korea*
B.S. in Computer Engineering — *Mar. 2009 - Feb. 2015*
- Undergraduate advisor: Sam H. Noh

Work Experience

Microsoft Research — *Redmond, WA, US*
Research Intern — *May. 2021 - Aug. 2021*
- Duties included: Elastically scaling out AMBROSIA that is a general framework to build resilient distributed systems
- Mentor: Jonathan Goldstein

Hewlett Packard Labs — *Palo Alto, CA, US*
Research Associate Intern — *Jun. 2019 - Aug. 2019*
- Duties included: Designing far-memory data structures optimized for one-sided RDMA operations
- Mentors: Kimberly Keeton, Sharad Singhal, and Marcos K. Aguilera

UNIST (Ulsan National Institute of Science and Technology) — *Ulsan, South Korea*
Researcher — *Mar. 2018 - Jul. 2018*
- Duties included: Providing the compiler-directed crash consistency for PM-based systems
- Supervisor: Sam H. Noh

Hewlett Packard Labs — *Palo Alto, CA, US*
Research Associate Intern — *Jun. 2017 - Sep. 2017*
- Duties included: Designing a DRAM cache for key-value stores working on Fabric-Attached Memory (FAM)
- Mentors: Kimberly Keeton, Haris Volos, and Yupu Zhang

UNIST (Ulsan National Institute of Science and Technology) *Ulsan, South Korea*
Researcher *Oct. 2015 - Feb. 2016*
- Duties included: Analyzing a PM-based file system (PMFS) and evaluating its performance
- Supervisor: Sam H. Noh

Republic of Korea Army *Gwacheon, South Korea*
Signaller *Aug. 2010 - May. 2012*

Honors & Awards

2022 **UT Austin Graduate Dean's Prestigious Fellowship Supplement** *2022*
2021 **UT Austin Graduate Dean's Prestigious Fellowship Supplement** *2021*
2021 **Microsoft Research PhD Fellowship** *2021-2023*

Publication

Conferences

Sekwon Lee, Soujanya Ponnapalli, Sharad Singhal, Marcos K. Aguilera, Kimberly Keeton, and Vijay Chidambaram, **DINOMO: An Elastic, Scalable, High-Performance Key-Value Store for Disaggregated Persistent Memory**, Proceedings of the VLDB Endowment, Volume 15, Issue 13 (VLDB 2023).

Se Kwon Lee, Jayashree Mohan, Sanidhya Kashyap, Taesoo Kim, and Vijay Chidambaram, **RECIPE: Converting Concurrent DRAM Indexes to Persistent-Memory Indexes**, Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).

Rohan Kadekodi, **Se Kwon Lee**, Sanidhya Kashyap, Taesoo Kim, Aasheesh Kolli and Vijay Chidambaram, **SplitFS: Reducing Software Overhead in File Systems for Persistent Memory**, Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).

Qingrui Liu, Joseph Izraelevitz, **Se Kwon Lee**, Michael L. Scott, Sam H. Noh, and Changhee Jung, **iDO: Compiler-Directed Failure Atomicity for Nonvolatile Memory**, Proceedings of the 51st Annual IEEE/ACM International Symposium on Microarchitecture (MICRO 2018).

Se Kwon Lee, K. Hyun Lim, Hyunsub Song, Beomseok Nam, and Sam H. Noh, **WORT: Write Optimal Radix Tree for Persistent Memory Storage Systems**, Proceedings of the 15th USENIX Conference on File and Storage Technology (FAST 2017).

Hyunsub Song, Young Je Moon, **Se Kwon Lee** and Sam H. Noh, **PMAL: Enabling Lightweight Adaptation of Legacy File Systems on Persistent Memory Systems**, Proceedings of the 2017 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2017).

Se Kwon Lee, Hyunsub Song, Young Je Moon and Sam H. Noh, **Experimental Evaluation of File System Data Structures for New Memory based Storage**, Proceedings of the 2016 Korea Computer Congress (KCC 2016, domestic conference in South Korea, **Best Paper Award**).

Hyunsub Song, Young Je Moon, **Se Kwon Lee** and Sam H. Noh, **Lightweight Adaptation of Legacy File Systems for Persistent Memory based Storage**, Proceedings of the 2016 Korea Computer Congress (KCC 2016, domestic conference in South Korea, **Best Paper Award**).

Workshops

Se Kwon Lee, Jayashree Mohan, Sanidhya Kashyap, Taesoo Kim, and Vijay Chidambaram, **RECIPE: Converting Concurrent DRAM Indexes to Persistent-Memory Indexes** (Extended abstract of SOSP 2019 paper), The 11th Annual Non-Volatile Memories Workshop (NVMW 2020).

Rohan Kadekodi, **Se Kwon Lee**, Sanidhya Kashyap, Taesoo Kim, Aasheesh Kolli and Vijay Chidambaram, **SplitFS: Reducing Software Overhead in File Systems for Persistent Memory** (Extended abstract of SOSP 2019 paper), The 11th Annual Non-Volatile Memories Workshop (NVMW 2020, **Memorable Paper Award**).

Qingrui Liu, Joseph Izraelevitz, **Se Kwon Lee**, Michael L. Scott, Sam H. Noh, and Changhee Jung, **iDO: Compiler-Directed Failure Atomicity for Nonvolatile Memory** (Extended abstract of MICRO 2018 paper), The 10th Annual Non-Volatile Memories Workshop (NVMW 2019).

Se Kwon Lee, K. Hyun Lim, Hyunsub Song, Beomseok Nam, and Sam H. Noh, **WORT: Write Optimal Radix Tree for Persistent Memory Storage Systems** (Extended abstract of FAST 2017 paper), The 8th Annual Non-Volatile Memories Workshop (NVMW 2017).

Hyunsub Song, Young Je Moon, **Se Kwon Lee**, and Sam H. Noh, **Transforming Legacy File Systems into Persistent Memory Exploiting File Systems with MeLo@V**, The 8th Annual Non-Volatile Memories Workshop (NVMW 2017).

Posters

Haris Volos, Kimberly Keeton, Yupu Zhang, Milind Chabbi, **Se Kwon Lee**, Mark Lillibridge, Yuvraj Patel, and Wei Zhang, **Memory-Oriented Distributed Computing at Rack Scale**, Poster at the 9th ACM Symposium on Cloud Computing (SOCC 2018).

Rohan Kadekodi, **Se Kwon Lee**, Aasheesh Kolli, and Vijay Chidambaram, **Ledger: Increasing Performance of POSIX Applications on Persistent Memory**, Poster at the 13th USENIX Symposium on Operating Systems Design and Implementation (OSDI 2018).

Haris Volos, Kimberly Keeton, Yupu Zhang, Milind Chabbi, **Se Kwon Lee**, Mark Lillibridge, Yuvraj Patel, and Wei Zhang, **Software challenges for persistent fabric-attached memory**, Poster at the 13th USENIX Symposium on Operating Systems Design and Implementation (OSDI 2018).

Hyunsub Song, Young Je Moon, **Se Kwon Lee**, and Sam H. Noh, **Adapting Legacy File Systems to Work Efficiently for Persistent Memory based Storage**, Poster at the 14th USENIX Conference on File and Storage Technology (FAST 2016).

Patents

Sam H. Noh, Young Je Moon, Hyunsub Song, and **Se Kwon Lee**, **Computing System and Method for Data Consistency**, Patent No. 10-1789933 (KO), 10-18-2017.

Skills

Programming Languages C, C++, Python, x86 assembly, Bash script
System Programming Linux kernel, Memcached, Tizen

Teaching Experience

Distributed Systems (CS380D) *UT Austin*
Teaching Assistant *Spring 2020*

Elements of Software Design (CS313E) *UT Austin*
Teaching Assistant *Fall 2018*

Objec-Oriented Programming *UNIST*
Teaching Assistant *Spring 2016*

System Programming *Hongik University*
Teaching Assistant *Spring 2015*

Services

2021 **Student Volunteer (Slack Chair)** The 28th ACM Symposium on Operating Systems Principles (SOSP 2021) *Virtual*

Reference

Vijay Chidambaram
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Kimberly Keeton
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