

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

PH.D. IN COMPUTER SCIENCE

- Advisor: Vijay Chidambaram

Austin, TX, US

Aug. 2018 - Present

UNIST (Ulsan National Institute of Science and Technology)

M.S. IN COMPUTER SCIENCE AND ENGINEERING

- Advisor: Sam H. Noh

Ulsan, South Korea

Mar. 2016 - Feb. 2018

Virginia Polytechnic Institute and State University

VISITING STUDENT

- Co-research advised by Changhee Jung

VA, U.S.A

Mar. 2017 - May 2017

Hongik University

B.S. IN COMPUTER ENGINEERING

- Undergraduate advisor: Sam H. Noh

Seoul, South Korea

Mar. 2009 - Feb. 2015

Work Experience

Microsoft Research

RESEARCH INTERN

- Duties included: Elastically scaling out AMBROSIA that is a general framework to build resilient distributed systems
- Mentor: Jonathan Goldstein

Redmond, WA, US

May. 2021 - Aug. 2021

Hewlett Packard Labs

RESEARCH ASSOCIATE INTERN

- Duties included: Designing far-memory data structures optimized for one-sided RDMA operations
- Mentors: Kimberly Keeton, Sharad Singhal, and Marcos K. Aguilera

Palo Alto, CA, US

Jun. 2019 - Aug. 2019

UNIST (Ulsan National Institute of Science and Technology)

RESEARCHER

- Duties included: Providing the compiler-directed crash consistency for PM-based systems
- Supervisor: Sam H. Noh

Ulsan, South Korea

Mar. 2018 - Jul. 2018

Hewlett Packard Labs

RESEARCH ASSOCIATE INTERN

- Duties included: Designing a DRAM cache for key-value stores working on Fabric-Attached Memory (FAM)
- Mentors: Kimberly Keeton, Haris Volos, and Yupu Zhang

Palo Alto, CA, US

Jun. 2017 - Sep. 2017

UNIST (Ulsan National Institute of Science and Technology)

RESEARCHER

- Duties included: Analyzing a PM-based file system (PMFS) and evaluating its performance
- Supervisor: Sam H. Noh

Ulsan, South Korea

Oct. 2015 - Feb. 2016

ROK DCC, Republic of Korea Armed Forces

SIGNALLER

Gwacheon, South Korea

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 Ponnappalli, Sharad Singhal, Marcos K. Aguilera, Kimberly Keeton, and Vijay Chidambaram, **DI-NOMO: 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, **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, **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**, Registration No. 10-1789933 (KO), Registration Date 10.18.2017.

Skills

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

Teaching Experience

Distributed Systems (CS380D)

TEACHING ASSISTANT

UT Austin
Spring 2020

Elements of Software Design (CS313E)

TEACHING ASSISTANT

UT Austin
Fall 2018

Objec-Oriented Programming

TEACHING ASSISTANT

UNIST
Spring 2016

System Programming

TEACHING ASSISTANT

Hongik University
Spring 2015

Services

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

Virtual

Reference

Vijay Chidambaram

Associate Professor, Department of CS
University of Texas at Austin
vijay@cs.utexas.edu

Beomseok Nam

Associate Professor, Department of CS
Sungkyunkwan University
bnam@skku.edu

Kimberly Keeton

Principal Engineer
Google
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Marcos K. Aguilera

Principal Researcher
VMware Research Group
maguilera@vmware.com

Sam H. Noh

Professor, School of ECE
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samhnoh@unist.ac.kr

Changhee Jung

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Sharad Singhal

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