

# Sekwon Lee

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## Research Interest

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### Computer Systems

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

**Focus:** Persistent Memory (PM) & Far memory (Disaggregated PM) aware systems design

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

## Education

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### University of Texas at Austin

PH.D. IN COMPUTER SCIENCE

- Advisor: Vijay Chidambaram

TX, U.S.A

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

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### 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

## Republic of Korea Army

SIGNALLER

Ulsan, South Korea

Oct. 2015 - Feb. 2016

Gwacheon, South Korea

Aug. 2010 - May. 2012

## Honors & Awards

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2021 **UT Austin Graduate Dean's Prestigious Fellowship Supplement**

2021

2021 **Microsoft Research PhD Fellowship**

2021-2023

## Publication

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### Conferences

**Se Kwon Lee**, Jayashree Mohan, Sanidhya Kashyap, Taesoo Kim, and Vijay Chidambaram, **RECIPE: Reusing Concurrent In-Memory Indexes for Persistent Memory**, 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** (written with Korean), 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** (written with Korean), Proceedings of the 2016 Korea Computer Congress (KCC 2016, domestic conference in South Korea).

### Workshops

**Se Kwon Lee**, Jayashree Mohan, Sanidhya Kashyap, Taesoo Kim, and Vijay Chidambaram, **RECIPE: Reusing Concurrent In-Memory Indexes for Persistent Memory** (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).

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

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<b>Programming Languages</b>	C, C++, Python, x86 assembly, Bash script
<b>System Programming</b>	Linux kernel, Memcached, Tizen
<b>Benchmarks</b>	Filebench, Fio, YCSB, ForestDB-benchmark, MC-benchmark, SPLASH3, Parsec, SPEC SFS2014, TPC-C

## Teaching Experience

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### 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*

## Reference

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### Vijay Chidambaram

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

### Sam H. Noh

Professor, School of ECE  
Ulsan National Institute of Science and Technology  
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### Beomseok Nam

Associate Professor, Department of CS  
Sungkyunkwan University  
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### Changhee Jung

Associate Professor, Department of CS  
Purdue University  
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**Kimberly Keeton**

(Former) Distinguished Technologist  
Hewlett Packard Labs  
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**Marcos K. Aguilera**

Senior Staff Engineer and Researcher  
VMware Research Group  
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**Sharad Singhal**

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