

张杰

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张杰博士现任北京大学计算机学院助理教授、特聘研究员、博士生导师，获得优秀青年科学基金海外项目（海外优青）、英特尔学术英才计划荣誉学者、ACM SIGSE 新星奖、博雅青年学者。他长期从事存储系统和专用处理器的研究和设计，致力于从计算机体系结构层面出发，解决大数据和人工智能时代对于高性能存储系统的需求，突破冯诺依曼体系结构下数据迁移的瓶颈以及内存墙的限制。负责和参与科技部重点研发项目（课题负责人）、国家自然科学基金重点项目（北大负责人）、韩国自然科学基金，得到华为、江波龙、三星电子、海力士、英特尔和西部数据的资助。自 2014 年起，在计算机国际会议及期刊上发表了 50 余篇论文，包括计算机体系结构与系统顶级会议 ISCA (CCF-A, 三篇)、OSDI (CCF-A)、HPCA (CCF-A, 七篇)、MICRO (CCF-A, 两篇)、ASPLOS (CCF-A)、FAST (CCF-A)、DAC (CCF-A) 和 Eurosys (CCF-A)，是该方向发表高水平论文最多的青年学者之一。申请人的论文得到美日韩德等国家和地区的学者引用 (Google Scholar 他引 609 余次)。引用源包括著名大学研究机构（如伊利诺伊大学、威斯康辛大学、加州大学圣地亚哥分校、宾州州立大学等）的国际知名学者（如 ACM/IEEE fellow）发表于顶级国际会议和期刊（如 OSDI、ISCA、HPCA、FAST、MICRO、ASPLOS 等）的重要论著。论文获 2019 年韩国计算机大会 (KCC) 最佳演讲论文奖和 2019 年非易失性内存研讨会 (NVMW) 优秀论文提名奖。在存储领域的研究成果被列为 KAIST50 年重大突破之一，并被多家新闻媒体报道。

工作经历

北京大学，北京，中国
计算机学院

KAIST, Daejeon, Korea

Electrical Engineering (Computing Division)

助理教授，博导

2021 年 7 月–至今

博士后

March 2020 年 3 月 –2021 年 5 月

教育经历

Yonsei University, Incheon, Korea

PhD in Engineering

Advisor: Dr. Myoungsoo Jung

August 2015 – Feb 2020

University of Texas at Dallas, Richardson, Texas

PhD in Computer Engineering (transfer to Korea)

Advisor: Dr. Myoungsoo Jung

August 2014 – August 2015

University of Texas at Dallas, Richardson, Texas

Master of Science in Electrical Engineering

Advisor: Dr. Myoungsoo Jung

August 2012 – May 2014

Nanjing University of Posts and Telecommunications, Nanjing, China

BS in Communication Engineering (computer communication)

September 2008 – July 2012

论文发表情况

2024

ISCA

Flagger: Cooperative Acceleration for Large-Scale Cross-Silo Federated Learning

CCF-A 会议

Aggregation

Xiurui Pan, Yuda An, Shengwen Liang, Bo Mao, Mingzhe Zhang, Qiao Li, Myoungsoo Jung, Jie Zhang

IEEE/ACM International Symposium on Computer Architecture

ASPLOS

Achieving Near-Zero Read Retry for 3D NAND Flash Memory

CCF-A 会议

Min Ye, Qiao Li, Yina Lv, Jie Zhang, Tianyu Ren, Daniel Wen, Tei-Wei Kuo, Chun Jason Xue

ACM International Conference on Architectural Support for Programming Languages and Operating Systems

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HPCA	StreamPIM: Streaming Matrix Computation in Racetrack Memory
CCF-A 会议	Yuda An, Yunxiao Tang, Shushu Yi, Li Peng, Xiurui Pan, Guangyu Sun, Zhaochu Luo, Qiao Li, Jie Zhang IEEE International Symposium on High-Performance Computer Architecture
HPCA	BeaconGNN: Large-Scale GNN Acceleration with Asynchronous In-Storage Computing
CCF-A 会议	Yuyue Wang, Xiurui Pan, Yuda An, Jie Zhang , Glenn Reinman IEEE International Symposium on High-Performance Computer Architecture
HPCA	LearnedFTL: A Learning-based Page-level FTL for Reducing Double Reads in Flash-based SSDs
CCF-A 会议	Shengzhe Wang, Zihang Lin, Suzhen Wu, Hong Jiang, Jie Zhang , Bo Mao IEEE International Symposium on High-Performance Computer Architecture
HPCA	Midas Touch: Invalid-Data Assisted Reliability and Performance Boost for 3D High-Density Flash
CCF-A 会议	QiaoLi, Hongyang Dang, Zheng Wan, Congming Gao, Min Ye, Jie Zhang , Tei-Wei Kuo, Chun Jason Xue IEEE International Symposium on High-Performance Computer Architecture

2023

NVMW	Optimizations of Linux Software RAID System for Next-Generation Storage
	Shushu Yi, Yanning Yang, Yunxiao Tang, Zixuan Zhou, Junzhe Li, Yue Chen, Myoungsoo Jung, Jie Zhang , The 14 th Annual Non-volatile Memories Workshop
SAC	BcBench: Exploring Throughput Processor Designs based on Blockchain Benchmarking
	Xiurui Pan, Yue Chen, Shushu Yi, Jie Zhang , The 38 th ACM/SIGAPP Symposium on Applied Computing
CAL	Intelligent SSD Firmware for Zero-Overhead Journaling
SCI 3 区	Hanyeoreum Bae, Donghyun Gouk, Seungjun Lee, Jiseon Kim, Sungjoon Koh, Jie Zhang , Myoungsoo Jung, IEEE Computer Architecture Letters (CAL)

2022

HotStorage	ScalaRAID: Optimizing Linux Software RAID System for Next-Generation Storage
	Shushu Yi, Yanning Yang, Yunxiao Tang, Zixuan Zhou, Junzhe Li, Yue Chen, Myoungsoo Jung, Jie Zhang , 14 th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 22)
THPC	Survey on Storage-Accelerator Data Movement
	Zixuan Zhou, Shushu Yi, Jie Zhang , CCF Transaction on High Performance Computing

NVMW	Integrating New Photonic-Based Heterogeneous Memory into Throughput Accelerators <i>Jie Zhang, Myoungsoo Jung,</i> <i>The 13th Annual Non-volatile Memories Workshop</i>
NVMW	HAMS: Hardware Automated Memory-over-Storage for Large-scale Memory Expansion <i>Jie Zhang, Miryeong Kwon, Donghyun Gouk, Sungjoon Koh, Nam Sung Kim,</i> <i>Mahmut Taylan Kandemir, Myoungsoo Jung</i> <i>The 13th Annual Non-volatile Memories Workshop</i>

2021

MICRO CCF-A 会议	Ohm-GPU: Integrating New Optical Network and Heterogeneous Memory into GPU Multi-Processors <i>Jie Zhang, Myoungsoo Jung,</i> <i>The 54th Annual IEEE/ACM International Symposium on Microarchitecture</i>
ISCA CCF-A 会议	Revamping Storage Class Memory with Hardware Automated Memory-Over-Storage Solution <i>Jie Zhang, Miryeong Kwon, Donghyun Gouk, Sungjoon Koh, Nam Sung Kim,</i> <i>Mahmut Kandemir, Myoungsoo Jung,</i> <i>The IEEE/ACM International Symposium on Computer Architecture</i>
NVMW	Architecting Throughput Processors with New Flash <i>Jie Zhang, Myoungsoo Jung,</i> <i>The 12th Annual Non-volatile Memories Workshop</i>
NVMW	DRAM-less Accelerator for Energy Efficient Data Processing <i>Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung</i> <i>The 12th Annual Non-volatile Memories Workshop</i>
NVMW	Manycore-Based Scalable SSD Architecture Towards One and More Million IOPS <i>Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,</i> <i>The 12th Annual Non-volatile Memories Workshop</i>

2020

ISCA CCF-A 会议	ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis <i>Jie Zhang, Myoungsoo Jung,</i> <i>The IEEE/ACM International Symposium on Computer Architecture</i>
FAST CCF-A 会议	Scalable Parallel Flash Firmware for Many-core Architectures <i>Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,</i> <i>The 18th USENIX Conference on File and Storage Technologies</i>
HPCA CCF-A 会议	DRAM-less: Hardware Acceleration of Data Processing with New Memory <i>Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung</i>

ISPASS

Data Direct I/O Characterization for Future I/O System Exploration

CCF-C 会议

Mohammad Alian, Yifan Yuan, **Jie Zhang**, Ren Wang, Myoungsoo Jung, Nam Sung Kim*The IEEE International Symposium on Performance Analysis of Systems and Software*

CAL

FastDrain: Removing Page Victimization Overheads in NVMe Storage Stack

SCI-3 区

Jie Zhang, Miryeong Kwon, Sanghyun Han, Nam Sung Kim, Mahmut Kandemir and

Myoungsoo Jung

IEEE Computer Architecture Letters (CAL)

2019

HPCA

FUSE: Fusing STT-MRAM into GPUs to Alleviate Off-Chip Memory Access Overheads

CCF-A 会议

Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,*25th IEEE International Symposium on High-Performance Computer Architecture*

IISWC

Faster than Flash: An In-Depth Study of System Challenges for Emerging Ultra-Low Latency SSDsSungjoon Koh, Junkyeok Jang, Changrim Lee, Miryeong Kwon, **Jie Zhang**, Myoungsoo Jung,*The 2019 IEEE International Symposium on Workload Characterization*

DAC

FlashGPU: Placing New Flash Next to GPU Cores

CCF-A 会议

Jie Zhang, Miryeong Kwon, Hyojong Kim, Hyesoon Kim, Myoungsoo Jung,*The 56th Design Automation Conference (DAC)*

TPDS

Exploring Fault-Tolerant Erasure Codes for Scalable All-Flash Array Clusters

CCF-A 期刊

Sungjoon Koh, **Jie Zhang**, Miryeong Kwon, Jungyeon Yoon, David Donofrio, Nam Sung Kim, Myoungsoo Jung,*IEEE Transactions on Parallel and Distributed Systems (TPDS)*

NVMW

Addressing Fast-Detrapping for Reliable 3D NAND Flash DesignMustafa Shihab, **Jie Zhang**, Myoungsoo Jung, Mahmut Kandemir,*10th Annual Non-Volatile Memories Workshop -- Nominated as Memorable Paper Award*

KCC

Maximizing GPU Cache Utilization with Adjustable Cache Line Management**Jie Zhang**, Myoungsoo Jung,*Korean Computer Congress (KCC), 2019 -- Nominated as Excellent Paper Award*

2018

OSDI

FlashShare: Punching Through Server Storage Stack from Kernel to Firmware for

CCF-A 会议

Ultra-Low Latency SSDs**Jie Zhang**, Miryeong Kwon, Donghyun Gouk, Changlim Lee, Mohammad Alian, Myoungjun Chun, Mahmut Kandemir, Nam Sung Kim, Jihong Kim, Myoungsoo Jung,

13th USENIX Symposium on Operating Systems Design and Implementation

MICRO

Amber: Enabling Precise Full-System Simulation with Detailed Modeling of All SSD

CCF-A 会议

Resources*Donghyun Gouk, Miryeong Kwon, [Jie Zhang](#), Sungjoon Koh, Wonil Choi, Nam Sung Kim, Mahmut Kandemir, Myoungsoo Jung,**The 51st Annual IEEE/ACM International Symposium on Microarchitecture*

TACO

ReveNAND: A Fast-Drift Aware Resilient 3D NAND Flash Design

CCF-B 期刊

*Mustafa Shihab, [Jie Zhang](#), Myoungsoo Jung, Mahmut Kandemir,**ACM Transactions on Architecture and Code Optimization (TACO), 2018*

Eurosys

FlashAbacus: A Self-governing Flash-based Accelerator for Low-power Systems

CCF-A 会议

*[Jie Zhang](#), Myoungsoo Jung,**The European Conference on Computer Systems (EuroSys), 2018*

IPDPS

CIAO: Cache Interference-Aware Throughput-Oriented Architecture and Scheduling for GPUs

CCF-B 会议

*[Jie Zhang](#), Shuwen Gao, Nam Sung Kim, Myoungsoo Jung,**32nd IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018***2017**

CAL

SimpleSSD: Modeling Solid State Drive for Holistic System Simulation

SCI-3 区

*Myoungsoo Jung, [Jie Zhang](#), Ahmed Abulila, Miryeong Kwon, Narges Shahidi, John Shalf, Nam Sung Kim and Mahmut Kandemir,**IEEE Computer Architecture Letters (CAL), 2017*

IISWC

Understanding System Characteristics of Online Erasure Coding on Scalable, Distributed and Large-Scale SSD Array Systems*Sungjoon Koh, [Jie Zhang](#), Miryeong Kwon, Jungyeon Yoon, David Donofrio, Nam Sung Kim, Myoungsoo Jung,**IEEE International Symposium on Workload Characterization (IISWC), 2017*

IISWC

TraceTracker: Hardware/Software Co-Evaluation for Large-Scale I/O Workload Reconstruction*Miryeong Kwon, [Jie Zhang](#), Gyuyoung Park, Wonil Choi, David Donofrio, John Shalf, Mahmut Kandemir, Myoungsoo Jung,**IEEE International Symposium on Workload Characterization (IISWC), 2017*

NPC

An In-depth Performance Analysis of Many-Integrated Core for Communication Efficient Heterogeneous Computing

CCF-C 会议

*[Jie Zhang](#), Myoungsoo Jung,**IFIP International Conference on Network and Parallel Computing (NPC), 2017*

NPC/IJPP	Enabling Realistic Logical Device Interface and Driver for NVM Express Enabled Full
CCF-C 会议	System Simulations
	<i>Donghyun Gouk, Jie Zhang, Myoungsoo Jung,</i>
	<i>IFIP International Conference on Network and Parallel Computing (NPC) and Invited for</i>
	<i>International Journal of Parallel Programming (IJPP), 2017</i>

2016

HPCA	DUANG: Fast and Lightweight Page Migration in Asymmetric Memory Systems
CCF-A 会议	<i>Hao Wang, Jie Zhang, Gieseok Park, Sharmila Shridhar, Myoungsoo Jung, Nam Sung Kim,</i>
	<i>IEEE Symposium on High Performance Computer Architecture (HPCA), 2016</i>
ASBD	A Study for Block-level I/O Trace Reconstruction on All-Flash Arrays
	<i>Miryeong Kwon, Jie Zhang, Gyuyoung Park, Myoungsoo Jung,</i>
	<i>Workshop on Architectures and Systems for Big Data (ASBD@ISCA), 2016</i>
NVMSA	An In-Depth Study of Next Generation Interface for Emerging Non-Volatile Memories
	<i>Wonil Choi, Jie Zhang, Shuwen Gao, Jaesoo Lee, Myoungsoo Jung, Mahmut Kandemir,</i>
	<i>IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA), 2016</i>
INFLOW	ROSS: A Design of Read-Oriented STT-MRAM Storage for Energy-Efficient Non-Uniform
	Cache Architecture
	<i>Jie Zhang, Miryeong Kwon, Chanyoung Park, Myoungsoo Jung, Songkuk Kim,</i>
	<i>USENIX Workshop on Interactions of NVM/Flash with Operating Systems and Workloads</i>
INFLOW	Couture: Tailoring STT-MRAM for Persistent Main Memory
	<i>Mustafa Shihab, Jie Zhang, Shuwen Gao, Josep Sloan, Myoungsoo Jung,</i>
	<i>USENIX Workshop on Interactions of NVM/Flash with Operating Systems and Workloads</i>

2015

ASBD	CoDEN: A Hardware/Software CoDesign Emulation Platform for SSD-Accelerated Near
	Data Processing
	<i>Jie Zhang, Damian Szmulewicz, Erick Macias, Myoungsoo Jung,</i>
	<i>The 5th Workshop on Architecture and System for Big Data (ASBD), 2015</i>
PACT	NVMMU: Direct Solid State Disk Access for GPU-Accelerated Data Processing
CCF-B 会议	<i>Jie Zhang, David Donofrio, John Shalf, Myoungsoo Jung,</i>
	<i>The 24th International Conference on Parallel Architecture and Compilation Techniques</i>
ICCD	OpenNVM: An Open-Sourced FPGA-based NVM Controller for Low Level Memory
CCF-B 会议	Characterization
	<i>Jie Zhang, Gieseok Park, David Donofrio, Mustafa Shihab, John Shalf and Myoungsoo Jung,</i>
	<i>The 33rd International Conference on Computer Design (ICCD), 2015</i>

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PACT-SRC	Integrating 3D Resistive Memory Cache into GPGPU for Energy-Efficient Data Processing <i>Jie Zhang, David Donofrio, John Shalf and Myoungsoo Jung,</i> <i>International Conference on parallel Architecture and Compilation Techniques (PACT) –</i> <i>ACM SRC 2nd Runner Award, 2015</i>
FAST-WiP	Shared Non-Volatile Memory Cache for Energy-Efficient High Throughput GPU Computing <i>Jie Zhang and Myoungsoo Jung,</i> <i>USENIX Conference on File and Storage Technologies Working in Progress (FAST WiP), 2015</i>

2014

HotStorage	Power, Energy, and Thermal Considerations in SSD-Based I/O Acceleration <i>Jie Zhang, Myoungsoo Jung,</i> <i>6th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 14), 2014</i>
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专利发表情况

- “Memory controlling device and computing device including the same”, Myoungsoo Jung, Donghyun Gouk, Miryeong Kwon, Sungjoon Koh, Jie Zhang, America (US20190171566A1)
- “Flash-based accelerator and computing device including the same”, Myoungsoo Jung, Jie Zhang, America (US10824341B2, US20180321859, US20170285968)
- “基于闪存的加速器和包含其的计算设备”, Myoungsoo Jung, Jie Zhang, China (CN107291424)
- “基于闪存的加速器及包括该加速器的计算设备”, Myoungsoo Jung, Jie Zhang, China (CN109460369)
- “Resistance switching memory-based accelerator”, Myoungsoo Jung, Gyuyoung PARK, Jie Zhang, America (US20180321880A1)
- “PARALLEL PROCESSING UNIT, COMPUTING DEVICE INCLUDING THE SAME, AND THREAD SCHEDULING METHOD”, Jie Zhang, Myoungsoo Jung, America (WO2018021620)
- “MEMORY CONTROL APPARATUS AND COMPUTING DEVICE INCLUDING SAME”, JUNG MYOUNGSOO, GOUK DONGHYUN, KWON MIRYEONG, KOH SUNGJOON, 정명수, JIE ZHANG, 국동현, 권미령, 고성준 장치에, Korea (KR1020180126267)
- “COMPUTING DEVICE, METHOD OF PROCESSING INPUT/OUTPUT REQUEST, AND RECORDING MEDIUM”, Jie Zhang, Myoungsoo Jung, Donghyun Gouk, Miryeong Kwon, Sungjoon Koh, America (pending)
- “FLASH-BASED COPROCESSOR”, Jie Zhang, Myoungsoo Jung, America (pending)
- “FLASH STORAGE DEVICE AND METHOD OF SCHEDULING PAGE VICTIMIZATION”, Jie Zhang, Myoungsoo Jung, America (pending)

研究经历

Research Assistant, Computer Architecture and Memory System Lab	2013 年 9 月 – 2021 年 5 月
<ul style="list-style-type: none">Cache and memory system optimization in GPGPU and multi-core system.Non-volatile memory (including Spin-transfer torque magnetic random-access memory and Phase Change Random Access Memory) characterization and optimization.Performance, power and thermal optimizations of Solid State Disk (SSD).	

学术活动情况

Journal Paper Review/Sub-review

- IEEE Transactions on Computer
- ACM Transactions on Storage
- ACM Transactions on Architecture and Code Optimization
- ACM Transactions on Computer Systems
- IEEE Transactions on Parallel and Distributed Systems
- IEEE Computer Architecture Letters
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems

Conference Paper Review/Sub-review

- MICRO'24'18 '16
- ISCA'24
- HPCA'24'18 '16
- USENIX ATC'23
- ChinaSys'22
- SAC'22
- HotStorage'20
- DAC'20 '19
- NVMSA'17 '16
- ICCD'19 '18 '17 '15
- IPDPS'18 '16
- DATE'19
- ASPLOS'19 '18 '17

演讲情况

- Invited talk, "ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis", Intel Computational Storage Lab, 2020
- Presentation, "ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis", ISCA, online, 2020
- Presentation, "DRAM-less: Hardware Acceleration of Data Processing with New Memory", HPCA, San Diego, CA, 2020
- Presentation, "Scalable Parallel Flash Firmware for Many-core Architectures", FAST, Santa Clara, CA, 2020
- Presentation, "FUSE: Fusing STT-MRAM into GPUs to Alleviate Off-Chip Memory Access Overheads", HPCA, Washington DC, 2019
- Presentation, "FlashGPU: Placing New Flash Next to GPU Cores", DAC, Las Vegas, NV, 2019
- Presentation, "Maximizing GPU Cache Utilization with Adjustable Cache Line Management", Jeju, South Korea, 2019
- Presentation, "FlashShare: Punching Through Server Storage Stack from Kernel to Firmware for Ultra-Low Latency SSDs", OSDI, Carlsbad, CA, 2018
- Presentation, "FlashAbacus: A Self-governing Flash-based Accelerator for Low-power Systems", Eurosys, Porto, Portugal, 2018
- Presentation, "CIAO: Cache Interference-Aware Throughput-Oriented Architecture and Scheduling for GPUs", IPDPS, Vancouver, Canada, 2018
- Presentation, "An In-depth Performance Analysis of Many-Integrated Core for Communication Efficient Heterogeneous Computing", NPC, Anhui, China, 2017

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- Presentation, "ROSS: A Design of Read-Oriented STT-MRAM Storage for Energy-Efficient Non-Uniform Cache Architecture", Inflow, Savannah, GA, 2016
 - Presentation, "Couture: Tailoring STT-MRAM for Persistent Main Memory", Inflow, Savannah, GA, 2016
 - Presentation, "CoDEN: A Hardware/Software CoDesign Emulation Platform for SSD-Accelerated Near Data Processing", ASBD, Portland, OR, 2015
 - Presentation, "NVMMU: Direct Solid State Disk Access for GPU-Accelerated Data Processing", PACT, San Francisco, CA, 2015
 - Presentation, "Integrating 3D Resistive Memory Cache into GPGPU for Energy-Efficient Data Processing", PACT SRC, San Francisco, CA, 2015
 - Presentation, "OpenNVM: An Open-Sourced FPGA-based NVM Controller for Low Level Memory Characterization", ICCD, New York city, NY, 2015
 - Presentation, "Shared Non-Volatile Memory Cache for Energy-Efficient High Throughput GPU Computing", FAST WiP, Santa Clara, CA, 2015
 - Presentation, "Power, Energy, and Thermal Considerations in SSD-Based I/O Acceleration", HotStorage, Philadelphia, PA, 2014
-

教学经历

- Computer Architecture (Fall'22)
 - Introduction of Computer System (Fall'22)
 - IIT 3002 Operating Systems (Fall'15, Fall'16)
 - IIT 6036 Computer Organization and Design (Fall'15, Fall'16)
 - IIT 7024 Advanced System Architecture (Spring'16)
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获奖情况

- 2023: 英特尔学术英才计划荣誉学者
- 2022: ACM SIGCSE 新星奖
- 2021: Our storage-class memory research is selected as KAIST breakthrough 50 years
- 2020-2021: Korean BK21+ Scholarship
- 2020: HPCA travel grant
- 2019: Annual Non-Volatile Memories Workshop (NVMW) -- Nominated as Memorable Paper Award
- 2019: Korea Computer Congress (KCC) -- Best Presentation Paper Award
- 2018: OSDI travel grant
- 2015: ACM Student Research Competition 2nd Runner Award