# JIE ZHANG

tel: +8619910031394|jiez@pku.edu.cn

Dr. Jie Zhang is currently an assistant professor of the school of Computer Science at Peking University, China. He is engaged in the research and design of storage systems, non-volatile memory and specialized processors. His research addresses the requirements for high-performance storage systems in the era of big data and artificial intelligence from the perspective of computer architecture. He is dedicated to breaking through the bottlenecks of data migration and the limitations of memory walls in the Von Neumann architecture. The projects he leads and have participated in have been funded by the U.S. Department of Energy, the U.S. Natural Science Foundation, the Korea Natural Science Foundation, Samsung Electronics, SK Hynix, Texas Instruments, and Western Digital with a cumulative total of over 4 million dollars. He has published over 60 papers in top-tier conferences and journals, including ISCA (five papers), OSDI, SOSP, HPCA (ten papers), MICRO (four papers), ASPLOS, FAST, NSDI, DAC, Eurosys, PACT, TPDS and TACO. He was inducted to HPCA Hall of Fame in 2025.

## WORK EXPERIENCE

**Peking University,** Beijing, China                                                    **Assistant Professor, PhD advisor**
School of Computer science                                                                        July 2021 –Current
**KAIST,** Daejeon, Korea                                                                      **Postdoctoral Researcher**
Electrical Engineering (Computing Division)                                             March 2020 –May 2021

## EDUCATION

**Yonsei University,** Incheon, Korea                                          **Advisor:** Dr. Myoungsoo Jung
PhD in Engineering                                                                         August 2015 – Feb 2020
**University of Texas at Dallas,** Richardson, Texas                      **Advisor:** Dr. Myoungsoo Jung
PhD in Computer Engineering (transfer to Korea)                          August 2014 – August 2015
**University of Texas at Dallas,** Richardson, Texas                      **Advisor:** Dr. Myoungsoo Jung
Master of Science in Electrical Engineering                                   August 2012 – May 2014
**Nanjing University of Posts and Telecommunications,** Nanjing, China
BS in Communication Engineering (computer communication)          September 2008 – July 2012

## PUBLICATIONS

### 2026

| | |
|---|---|
| **Eurosys** | **ColdCode: Cold Data Encoding for Enhanced Reliability and Lifetime in 3D NAND Flash** |
| *Top Conference* | *Qiao Li, Shangyu Wu, Zheng Wan, Yufei Cui, Jie Zhang, Chun Jason Xue* |
| | *21th ACM European Conference on Computer Systems* |

### 2025

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|---|---|
| **TCAD** | **CXL-DMSim: A Full-System CXL Disaggregated Memory Simulator With Comprehensive Silicon Validation** |
| *Top Journal* | *Yanjing Wang, Lizhou Wu, Wentao Hong, Yang Ou, Zicong Wang, Sunfeng Gao, Jie Zhang, Sheng Ma, Dezun Dong, Xingyun Qi, Mingche Lai, Nong Xiao* |
| **PACT** | **Exploring Memory Tiering Systems in the CXL Era via FPGA-based Emulation and Device-** |
| *Top Conference* | **Side Management** |
| | *Yiqi Chen, Xiping Dong, Zhe Zhou, Zhao Wang, Jie Zhang, Guangyu Sun,* |
| | *International Conference on Parallel Architecture and Compilation Techniques* |

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|---|---|
| **NEWTON** | **Ultrafast and Reliable Domain-Wall and Skyrmion Logic in a Chirally Coupled Ferrimagnet** |
| *Top Journal* | *Yifei Ma, Dihua Wu, Fengbo Yan, Xiaoxiao Fang, Peixin Qin, Leran Wang, Li Liu, Laichuan Shen, Zhiqi Liu, Wenyun Yang,* **Jie Zhang**, *Yanglong Hou, Yan Zhou, Feng Luo, Jinbo Yang, Kaiming Cai, Shuai Ning, Zhaochu Luo* |
| | *Cell Press NEWTON* |
| **SOSP** | **Aeolia: Fast and Secure Userspace Interrupt-Based Storage Stack** |
| *Top Conference* | *Chuandong Li, Ran Yi, Zonghao Zhang, Jing Liu, Changwoo Min,* **Jie Zhang**, *Yingwei Luo, Xiaolin Wang, Zhenling Wang, Diyu Zhou* |
| | *ACM Symposium on Operating Systems Principles* |
| **HotStorage** | **SPDK+: Low Latency or High Power Efficiency? We Take Both** |
| | *Endian Li, Shushu Yi, Li Peng, Qiao Li, Diyu Zhou, Zhenlin Wang, Xiaolin Wang, Bo Mao, Yingwei Luo, Ke Zhou,* **Jie Zhang\*** |
| | *The 17th ACM Workshop on Hot Topics in Storage and File Systems* |
| **ICDE** | **BL-Tree: The Best of Both Worlds by combining B+-Tree on Top and LSM-Tree on Bottom** |
| *Top Conference* | *Maoxin Ye, Zuocheng Wang, Shengzhe Wang, Jiahong Chen, Chunfeng Du,* **Jie Zhang**, *Ke Zhou, Suzhen Wu, Bo Mao* |
| | *IEEE International Conference on Data Engineering* |
| **ToS** | **Enhancing the Performance of Next-Generation SSD Arrays: A Holistic Approach** |
| *Top Journal* | **Jie Zhang\***, *Shushu Yi, Xiurui Pan, Qiao Li, Qiang Li, Chenxi Wang, Bo Mao, Myoungsoo Jung* |
| | *ACM Transactions on Storage* |
| **TCAD** | **FlexHMB: A Flexible HMB Design towards Bufferless Mobile Flash** |
| *Top Journal* | *Yong Peng, Li Peng, Shaocong Sun, Lujia Yin, Qiao Li,* **Jie Zhang\*** |
| | *ACM Transactions on Computer-Aided Design of Integrated Circuits and Systems* |
| **ISCA** | **XHarvest: Rethinking High-Performance and Cost-Efficient SSD Architecture with** |
| *Top Conference* | **CXL-Driven Harvesting** |
| | *Li Peng, Wenbo Wu, Shushu Yi, Xianzhang Chen, Chenxi Wang, Shengwen Liang, Zhe Wang, Nong Xiao, Qiao Li, Mingzhe Zhang,* **Jie Zhang\*** |
| | *IEEE/ACM International Symposium on Computer Architecture* |
| **ISCA** | **ArtMem: Adaptive Migration in Reinforcement Learning-Enabled Tiered Memory** |
| *Top Conference* | *Xinyue Yi, Hongchao Du, Yu Wang,* **Jie Zhang**, *Qiao Li, Chun Jason Xue* |
| | *IEEE/ACM International Symposium on Computer Architecture* |
| **Eurosys** | **Daredevil: Rescue Your Flash Storage from Inflexible Kernel Storage Stack** |
| *Top Conference* | *Junzhe Li, Ran Shu, Jiayi Lin, Qingyu Zhang, Ziyue Yang,* **Jie Zhang**, *Yongqiang Xiong, Chenxiong Qian* |
| | *20th ACM European Conference on Computer Systems* |
| **NSDI** | **Beehive: A Scalable Disaggregated Memory Runtime Exploiting Asynchrony of** |
| *Top Conference* | **Multithreaded Programs** |

*Quanxi Li, Hong Huang, Ying Liu, Yanwen Xia, Jie Zhang, Mosong Zhou, Xiaobing Feng, Huimin Cui, Quan Chen, Yizhou Shan, Chenxi Wang*

*22nd USENIX Symposium on Networked Systems Design and Implementation*

| | |
|---|---|
| **HPCA** | **InstAttention: In-Storage Attention Offloading for Cost-Effective Long-Context LLM** |
| *Top Conference* | **Inference** |

*Xiurui Pan, Endian Li, Qiao Li, Shengwen Liang, Yizhou Shan, Ke Zhou, Yingwei Luo, Xiaolin Wang, Jie Zhang\**

*IEEE International Symposium on High-Performance Computer Architecture*

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|---|---|
| **HPCA** | **NeuVSA: A Unified and Efficient Accelerator for Neural Vector Search** |
| *Top Conference* | |

*Ziming Yuan, Lei Dai, Wen Li, Jie Zhang, Shengwen Liang, Ying Wang, Cheng Liu, Huawei Li, Jiafeng Guo, Peng Wang, Renhai Chen, Gong Zhang*

*IEEE International Symposium on High-Performance Computer Architecture*

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|---|---|
| **HPCA** | **Criticality-Aware Instruction-Centric Bandwidth Partitioning for Data Center Applications** |
| *Top Conference* | |

*Liren Zhu, Liujia Li, Jianyu Wu, Yiming Yao, Zhan Shi, Jie Zhang, Zhenlin Wang, Xiaolin Wang, Yingwei Luo, Diyu Zhou*

*IEEE International Symposium on High-Performance Computer Architecture*

## 2024

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|---|---|
| **SOSP** | **BIZA: Design of Self-Governing Block-Interface ZNS AFA for Endurance and Performance** |
| *Top Conference* | |

*Shushu Yi, Shaocong Sun, Li Peng, Yingbo Sun, Ming-Chang Yang, Zhichao Cao, Qiao Li, Myoungsoo Jung, Ke Zhou, Jie Zhang\**

*ACM Symposium on Operating Systems Principles*

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|---|---|
| **MICRO** | **NeoMem: Hardware/Software Co-Design for CXL-Native Memory Tiering** |
| *Top Conference* | |

*Zhe Zhou, Yiqi Chen, Tao Zhang, Yang Wang, Ran Shu, Shuotao Xu, Peng Cheng, Lei Qu, Yongqiang Xiong, Jie Zhang, Guangyu Sun*

*The 57th Annual IEEE/ACM International Symposium on Microarchitecture*

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|---|---|
| **MICRO** | **Cambricon-llm: A chiplet-based hybrid architecture for on-device Inference of 70B LLM** |
| *Top Conference* | |

*Zhongkai Yu, Shengwen Liang, Tianyu Ma, Yunke Cai, Ziyuan Nan, Di Huang, Xinkai Song, Yifan Hao, Jie Zhang, Tian Zhi, Yongwei Zhao, Zidong Du, Xing Hu Qi Guo, Tianshi Chen*

*The 57th Annual IEEE/ACM International Symposium on Microarchitecture*

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|---|---|
| **ToS** | **Extremely-Compressed SSDs with I/O Behavior Prediction** |
| *Top Journal* | |

*Xiangyu Yao, Qiao Li, Kaihuan Lin, Xinbiao Gan, Jie Zhang, Congming Gao, Zhirong Shen, Quanqing Xu, Chuanhui Yang, Jason Xue*

*ACM Transactions on Storage*

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|---|---|
| **TC** | **Land of Oz: Resolving Orderless Writes in Zoned Namespace SSDs** |
| *Top Journal* | |

*Yingjia Wang, You Zhou, Fei Wu, Jie Zhang, Ming-Chang Yang*

*IEEE Transactions on Computers*

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|---|---|
| **USENIX ATC** | **ScalaAFA: Constructing User-Space All-Flash Array Engine with Holistic Designs** |

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|---|---|
| *Top Conference* | *Shushu Yi, Xiurui Pan, Qiao Li, Qiang Li, Chenxi Wang, Bo Mao, Myoungsoo Jung, Jie Zhang\** |
| | *USENIX Annual Technical Conference* |
| **USENIX ATC** | **ScalaCache: Scalable User-Space Page Cache Management with Software-Hardware** |
| *Top Conference* | **Coordination** |
| | *Li Peng, Yuda An, You Zhou, Chenxi Wang, Qiao Li, Chuanning Chen, Jie Zhang\** |
| | *USENIX Annual Technical Conference* |
| **Arxiv** | **From RDMA to RDCA: Toward High-Speed Last Mile of Data Center Networks Using Remote Direct Cache Access** |
| | *Qiang Li, Qiao Xiang, Derui Liu, Yuxin Wang, Haonan Qiu, Xiaoliang Wang, Jie Zhang, Ridi Wen, Haohao Song, Gexiao Tian, Chenyang Huang, Lulu Chen, Shaozong Liu, Yaohui Wu, Zhiwu Wu, Zicheng Luo, Yuchao Shao, Chao Han, Zongjie WU, Jianbo Dong, Zheng Cao, Jinbo WU, Jiwu Shu, Jiesheng Wu* |
| | *Arxiv* |
| **TACO** | **Characterizing and Optimizing LDPC Performance on 3D NAND Flash Memories** |
| *Top Journal* | *Qiao Li, Yu Chen, Guanyu Wu, Yajuan Du, Min Ye, Xinbiao Gan, Jie Zhang, Zhirong Shen, Jiwu Shu, Chun Jason Xue* |
| | *ACM Transactions on Architecture and Code Optimization* |
| **ISCA** | **Flagger: Cooperative Acceleration for Large-Scale Cross-Silo Federated Learning** |
| *Top Conference* | **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** |
| *Top Conference* | *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* |
| **HPCA** | **StreamPIM: Streaming Matrix Computation in Racetrack Memory** |
| *Top Conference* | *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** |
| *Top Conference* | *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** |
| *Top Conference* | **SSDs** |
| | *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-** |

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**Top Conference** | **Density Flash**

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 14th Annual Non-volatile Memories Workshop*

**SAC** | **BcBench: Exploring Throughput Processor Designs based on Blockchain Benchmarking**

Xiurui Pan, Yue Chen, Shushu Yi, *Jie Zhang\*,*

*The 38th ACM/SIGAPP Symposium on Applied Computing*

**CAL** | **Intelligent SSD Firmware for Zero-Overhead Journaling**

**SCI Journal** | Hanyeoreum Bae, Donghyun Gouk, Seungjun Lee, Jiseon Kim, Sungjoon Koh, *Jie Zhang\*,* and 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\*,*

*14th 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**

*Jie Zhang*, Myoungsoo Jung,

*The 13th Annual Non-volatile Memories Workshop*

**NVMW** | **HAMS: Hardware Automated Memory-over-Storage for Large-scale Memory Expansion**

*Jie Zhang*, Miryeong Kwon, Donghyun Gouk, Sungjoon Koh, Nam Sung Kim,

Mahmut Taylan Kandemir, Myoungsoo Jung

*The 13th Annual Non-volatile Memories Workshop*

## 2021

**MICRO** | **Ohm-GPU: Integrating New Optical Network and Heterogeneous Memory into GPU**

**Top Conference** | **Multi-Processors**

*Jie Zhang*, Myoungsoo Jung,

*The 54th Annual IEEE/ACM International Symposium on Microarchitecture*

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| **ISCA**<br>*Top Conference* | **Revamping Storage Class Memory with Hardware Automated Memory-Over-Storage Solution**<br><br>*Jie Zhang, Miryeong Kwon, Donghyun Gouk, Sungjoon Koh, Nam Sung Kim,*<br><br>*Mahmut Kandemir, Myoungsoo Jung,*<br><br>*The IEEE/ACM International Symposium on Computer Architecture* |
| **NVMW** | **Architecting Throughput Processors with New Flash**<br><br>*Jie Zhang, Myoungsoo Jung,*<br><br>*The 12th Annual Non-volatile Memories Workshop* |
| **NVMW** | **DRAM-less Accelerator for Energy Efficient Data Processing**<br><br>*Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung*<br><br>*The 12th Annual Non-volatile Memories Workshop* |
| **NVMW** | **Manycore-Based Scalable SSD Architecture Towards One and More Million IOPS**<br><br>*Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,*<br><br>*The 12th Annual Non-volatile Memories Workshop* |

## 2020

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|---|---|
| **ISCA**<br>*Top Conference* | **ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis**<br>*Jie Zhang, Myoungsoo Jung,*<br><br>*The IEEE/ACM International Symposium on Computer Architecture* |
| **FAST**<br>*Top Conference* | **Scalable Parallel Flash Firmware for Many-core Architectures**<br>*Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,*<br><br>*The 18th USENIX Conference on File and Storage Technologies* |
| **HPCA**<br>*Top Conference* | **DRAM-less: Hardware Acceleration of Data Processing with New Memory**<br>*Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung*<br><br>*26th IEEE International Symposium on High-Performance Computer Architecture* |
| **ISPASS**<br>*Major Conference* | **Data Direct I/O Characterization for Future I/O System Exploration**<br>*Mohammad Alian, Yifan Yuan, Jie Zhang, Ren Wang, Myoungsoo Jung, Nam Sung Kim*<br><br>*The IEEE International Symposium on Performance Analysis of Systems and Software* |
| **CAL**<br>*SCI Journal* | **FastDrain: Removing Page Victimization Overheads in NVMe Storage Stack**<br>*Jie Zhang, Miryeong Kwon, Sanghyun Han, Nam Sung Kim, Mahmut Kandemir and*<br><br>*Myoungsoo Jung*<br><br>*IEEE Computer Architecture Letters (CAL)* |

## 2019

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| **HPCA**<br>*Top Conference* | **FUSE: Fusing STT-MRAM into GPUs to Alleviate Off-Chip Memory Access Overheads**<br>*Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,*<br>*25th IEEE International Symposium on High-Performance Computer Architecture* |

**IISWC**

**Major Conference**

**Faster than Flash: An In-Depth Study of System Challenges for Emerging Ultra-Low Latency SSDs**

*Sungjoon Koh, Junkyeok Jang, Changrim Lee, Miryeong Kwon, Jie Zhang, Myoungsoo Jung,*

*The 2019 IEEE International Symposium on Workload Characterization*

**DAC**

**Top Conference**

**FlashGPU: Placing New Flash Next to GPU Cores**

*Jie Zhang, Miryeong Kwon, Hyojong Kim, Hyesoon Kim, Myoungsoo Jung,*

*The 56th Design Automation Conference (DAC), 2019*

**TPDS**

**Top Journal**

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

*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 Design**

*Mustafa 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 -- Excellent Paper Award*

## 2018

**OSDI**

**Top Conference**

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

**Top Conference**

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

**Top Journal**

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

*Mustafa Shihab, Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,*

*ACM Transactions on Architecture and Code Optimization (TACO), 2018*

**Eurosys**

**Top Conference**

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

*Jie Zhang, Myoungsoo Jung,*

*The European Conference on Computer Systems (EuroSys), 2018*

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

*Major Conference* **GPUs**

*Jie Zhang*, Shuwen Gao, Nam Sung Kim, Myoungsoo Jung,

32$^{nd}$ IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018

## 2017

**CAL** **SimpleSSD: Modeling Solid State Drive for Holistic System Simulation**

*Major Journal* 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**

*Major Conference* **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**

*Major Conference* **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**

*Jie Zhang*, Myoungsoo Jung,

IFIP International Conference on Network and Parallel Computing (NPC), 2017

**IJPP** **Enabling Realistic Logical Device Interface and Driver for NVM Express Enabled Full**

*Major Journal* **System Simulations**

Donghyun Gouk, *Jie Zhang*, Myoungsoo Jung,

IFIP International Conference on Network and Parallel Computing (NPC) and Invited for

International Journal of Parallel Programming (IJPP), 2017

## 2016

**HPCA** **DUANG: Fast and Lightweight Page Migration in Asymmetric Memory Systems**

*Top Conference* Hao Wang, *Jie Zhang*, Gieseo Park, Sharmila Shridhar, Myoungsoo Jung, Nam Sung Kim,

IEEE Symposium on High Performance Computer Architecture (HPCA), 2016

**ASBD** **A Study for Block-level I/O Trace Reconstruction on All-Flash Arrays**

Miryeong Kwon, *Jie Zhang*, Gyuyoung Park, Myoungsoo Jung,

*Workshop on Architectures and Systems for Big Data (ASBD@ISCA), 2016*

**NVMSA** **An In-Depth Study of Next Generation Interface for Emerging Non-Volatile Memories**

*Major Conference* Wonil Choi, *Jie Zhang*, Shuwen Gao, Jaesoo Lee, Myoungsoo Jung, Mahmut Kandemir,

*IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA), 2016*

**INFLOW** **ROSS: A Design of Read-Oriented STT-MRAM Storage for Energy-Efficient Non-Uniform Cache Architecture**

*Jie Zhang*, Miryeong Kwon, Chanyoung Park, Myoungsoo Jung, Songkuk Kim,

USENIX Workshop on Interactions of NVM/Flash with Operating Systems and Workloads

**INFLOW** **Couture: Tailoring STT-MRAM for Persistent Main Memory**

*Mustafa Shihab, Jie Zhang, Shuwen Gao, Josep Sloan, Myoungsoo Jung,*

*USENIX Workshop on Interactions of NVM/Flash with Operating Systems and Workloads*

## 2015

**ASBD** **CoDEN: A Hardware/Software CoDesign Emulation Platform for SSD-Accelerated Near Data Processing**

*Jie Zhang*, Damian Szmulewicz, Erick Macias, Myoungsoo Jung,

*The 5th Workshop on Architecture and System for Big Data (ASBD), 2015*

**PACT** **NVMMU: Direct Solid State Disk Access for GPU-Accelerated Data Processing**

*Top Conference* *Jie Zhang*, David Donofrio, John Shalf, Myoungsoo Jung,

*The 24th International Conference on Parallel Architecture and Compilation Techniques*

**ICCD** **OpenNVM: An Open-Sourced FPGA-based NVM Controller for Low Level Memory**

*Major Conference* **Characterization**

*Jie Zhang*, Gieseo Park, David Donofrio, Mustafa Shihab, John Shalf and Myoungsoo Jung,

*The 33rd International Conference on Computer Design (ICCD), 2015*

**PACT-SRC** **Integrating 3D Resisteive Memory Cache into GPGPU for Energy-Efficient Data Processing**

*Jie Zhang*, David Donofrio, John Shalf and Myoungsoo Jung,

*International Conference on parallel Architecture and Compilation Techniques (PACT) – ACM SRC 2nd Runner Award, 2015*

**FAST-WiP** **Shared Non-Volatile Mmeory Cache for Energy-Efficient High Throughput GPU Computing**

*Jie Zhang* and Myoungsoo Jung,

*USENIX Conference on File and Storage Technologies Working in Progress (FAST WiP), 2015*

## 2014

**HotStorage** **Power, Energy, and Thermal Considerations in SSD-Based I/O Acceleration**

*Jie Zhang*, Myoungsoo Jung,

*6th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 14), 2014*

# JIE ZHANG

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## PATENTS

- "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 장지에, 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)

## EXPERIENCE

**Research Assistant, Computer Architecture and Memory System Lab**　　　　　**Sep 2013 – May 2021**
- 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).

## External Activities

**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

## Invited Talks and Presentations

- 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", Carlsbad, CA, 2018
- Presentation, "FlashAbacus: A Self-governing Flash-based Accelerator for Low-power Systems", 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
- 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

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## Teaching Experience

- 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)

## Honors

- 2025: HPCA Hall of Fame
- 2025: OlympicMons Award
- 2023: Intel Young Faculty Research Program
- 2022: ACM SIGCSE Rising Star Award
- 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