

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, Eurosyst, PACT, TPDS and TACO. He was inducted to HPCA Hall of Fame in 2025.

WORK EXPERIENCE

Peking University, Beijing, China

School of Computer science

KAIST, Daejeon, Korea

Electrical Engineering (Computing Division)

Assistant Professor, PhD advisor

July 2021 – Current

Postdoctoral Researcher

March 2020 – May 2021

EDUCATION

Yonsei University, Incheon, Korea

PhD in Engineering

University of Texas at Dallas, Richardson, Texas

PhD in Computer Engineering (transfer to Korea)

University of Texas at Dallas, Richardson, Texas

Master of Science in Electrical Engineering

Nanjing University of Posts and Telecommunications, Nanjing, China

BS in Communication Engineering (computer communication)

Advisor: Dr. Myoungsoo Jung

August 2015 – Feb 2020

Advisor: Dr. Myoungsoo Jung

August 2014 – August 2015

Advisor: Dr. Myoungsoo Jung

August 2012 – May 2014

September 2008 – July 2012

PUBLICATIONS

2026

FAST **Xerxes: Extensive Exploration of Scalable Hardware Systems with CXL-Based Simulation**

Top Conference **Framework**

*Yuda An, Shushu Yi, Bo Mao, Qiao Li, Mingzhe Zhang, Diyu Zhou, Ke Zhou, Nong Xiao, Guangyu Sun, Yingwei Luo, Jie Zhang**

The USENIX Conference on File and Storage Technologies

HPCA **AutoGNN: End-to-End Hardware-Driven Graph Preprocessing for Enhanced GNN**

Top Conference **Performance**

Seungkwan Kang, Seungjun Lee, Donghyun Gouk, Miryeong Kwon, Hyunkyu Choi, Junhyeok Jang, Sangwon Lee, Huiwon Choi, Jie Zhang, Wonil Choi, Mahmut T Kandemir, Myoungsoo Jung

IEEE International Symposium on High-Performance Computer Architecture

Eurosyst **ColdCode: Cold Data Encoding for Enhanced Reliability and Lifetime in 3D NAND Flash**

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Top Conference Qiao Li, Shangyu Wu, Zheng Wan, Yufei Cui, **Jie Zhang***, Chun Jason Xue

21th ACM European Conference on Computer Systems

2025

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, <i>International Conference on Parallel Architecture and Compilation Techniques</i>
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 <i>Cell Press NEWTON</i>
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 <i>ACM Symposium on Operating Systems Principles</i>
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* <i>The 17th ACM Workshop on Hot Topics in Storage and File Systems</i>
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 <i>IEEE International Conference on Data Engineering</i>
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 <i>ACM Transactions on Storage</i>
TCAD	FlexHMB: A Flexible HMB Design towards Bufferless Mobile Flash
Top Journal	Yong Peng, Li Peng, Shaocong Sun, Lujia Yin, Qiao Li, Jie Zhang* <i>ACM Transactions on Computer-Aided Design of Integrated Circuits and Systems</i>
ISCA	XHarvest: Rethinking High-Performance and Cost-Efficient SSD Architecture with CXL-Driven Harvesting
Top Conference	Li Peng, Wenbo Wu, Shushu Yi, Xianzhang Chen, Chenxi Wang, Shengwen Liang, Zhe Wang,

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*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

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

HPCA

Criticality-Aware Instruction-Centric Bandwidth Partitioning for Data Center Applications

Top Conference

Liren Zhu, Liuji 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

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

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

MICRO

Cambricon-llm: A chiplet-based hybrid architecture for on-device Inference of 70B LLM

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Top Conference	<i>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</i> <i>The 57th Annual IEEE/ACM International Symposium on Microarchitecture</i>
ToS	Extremely-Compressed SSDs with I/O Behavior Prediction
Top Journal	<i>Xiangyu Yao, Qiao Li, Kaihuan Lin, Xinbiao Gan, Jie Zhang, Congming Gao, Zhirong Shen, Quanqing Xu, Chuanhui Yang, Jason Xue</i> <i>ACM Transactions on Storage</i>
TC	Land of Oz: Resolving Orderless Writes in Zoned Namespace SSDs
Top Journal	<i>Yingjia Wang, You Zhou, Fei Wu, Jie Zhang, Ming-Chang Yang</i> <i>IEEE Transactions on Computers</i>
USENIX ATC	ScalaAFA: Constructing User-Space All-Flash Array Engine with Holistic Designs
Top Conference	<i>Shushu Yi, Xiurui Pan, Qiao Li, Qiang Li, Chenxi Wang, Bo Mao, Myoungsoo Jung, Jie Zhang*</i> <i>USENIX Annual Technical Conference</i>
USENIX ATC	ScalaCache: Scalable User-Space Page Cache Management with Software-Hardware Coordination
Top Conference	<i>Li Peng, Yuda An, You Zhou, Chenxi Wang, Qiao Li, Chuanning Chen, Jie Zhang*</i> <i>USENIX Annual Technical Conference</i>
Arxiv	From RDMA to RDCA: Toward High-Speed Last Mile of Data Center Networks Using Remote Direct Cache Access
	<i>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</i>
	<i>Arxiv</i>
TACO	Characterizing and Optimizing LDPC Performance on 3D NAND Flash Memories
Top Journal	<i>Qiao Li, Yu Chen, Guanyu Wu, Yajuan Du, Min Ye, Xinbiao Gan, Jie Zhang, Zhirong Shen, Jiwu Shu, Chun Jason Xue</i> <i>ACM Transactions on Architecture and Code Optimization</i>
ISCA	Flagger: Cooperative Acceleration for Large-Scale Cross-Silo Federated Learning
Top Conference	Aggregation
	<i>Xiurui Pan, Yuda An, Shengwen Liang, Bo Mao, Mingzhe Zhang, Qiao Li, Myoungsoo Jung, Jie Zhang*</i> <i>IEEE/ACM International Symposium on Computer Architecture</i>
ASPLOS	Achieving Near-Zero Read Retry for 3D NAND Flash Memory
Top Conference	<i>Min Ye, Qiao Li, Yina Lv, Jie Zhang, Tianyu Ren, Daniel Wen, Tei-Wei Kuo, Chun Jason Xue</i> <i>ACM International Conference on Architectural Support for Programming Languages and Operating Systems</i>
HPCA	StreamPIM: Streaming Matrix Computation in Racetrack Memory

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

2023

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

2022

HotStorage	ScalaRAID: Optimizing Linux Software RAID System for Next-Generation Storage
	<i>Shushu Yi, Yanning Yang, Yunxiao Tang, Zixuan Zhou, Junzhe Li, Yue Chen, Myoungsoo Jung, Jie Zhang*,</i>
	<i>14th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 22)</i>
THPC	Survey on Storage-Accelerator Data Movement
	<i>Zixuan Zhou, Shushu Yi, Jie Zhang*,</i>
	<i>CCF Transaction on High Performance Computing</i>
NVMW	Integrating New Photonic-Based Heterogeneous Memory into Throughput Accelerators

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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

ISCA

Revamping Storage Class Memory with Hardware Automated Memory-Over-Storage

Top Conference

Solution

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

Mahmut Kandemir, Myoungsoo Jung,

The IEEE/ACM International Symposium on Computer Architecture

NVMW

Architecting Throughput Processors with New Flash

Jie Zhang, Myoungsoo Jung,

The 12th Annual Non-volatile Memories Workshop

NVMW

DRAM-less Accelerator for Energy Efficient Data Processing

Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung

The 12th Annual Non-volatile Memories Workshop

NVMW

Manycore-Based Scalable SSD Architecture Towards One and More Million IOPS

Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,

The 12th Annual Non-volatile Memories Workshop

2020

ISCA

ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis

Top Conference

Jie Zhang, Myoungsoo Jung,

The IEEE/ACM International Symposium on Computer Architecture

FAST

Scalable Parallel Flash Firmware for Many-core Architectures

Top Conference

Jie Zhang, Miryeong Kwon, Michael Swift, Myoungsoo Jung,

The 18th USENIX Conference on File and Storage Technologies

HPCA

DRAM-less: Hardware Acceleration of Data Processing with New Memory

Top Conference

Jie Zhang, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung

26th IEEE International Symposium on High-Performance Computer Architecture

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ISPASS	Data Direct I/O Characterization for Future I/O System Exploration
Major Conference	<i>Mohammad Alian, Yifan Yuan, Jie Zhang, Ren Wang, Myoungsoo Jung, Nam Sung Kim</i> <i>The IEEE International Symposium on Performance Analysis of Systems and Software</i>
CAL	FastDrain: Removing Page Victimization Overheads in NVMe Storage Stack
SCI Journal	<i>Jie Zhang, Miryeong Kwon, Sanghyun Han, Nam Sung Kim, Mahmut Kandemir and Myoungsoo Jung</i> <i>IEEE Computer Architecture Letters (CAL)</i>

2019

HPCA	FUSE: Fusing STT-MRAM into GPUs to Alleviate Off-Chip Memory Access Overheads
Top Conference	<i>Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,</i> <i>25th IEEE International Symposium on High-Performance Computer Architecture</i>
IISWC	Faster than Flash: An In-Depth Study of System Challenges for Emerging Ultra-Low Latency SSDs
Major Conference	<i>Sungjoon Koh, Junkyeok Jang, Changrim Lee, Miryeong Kwon, Jie Zhang, Myoungsoo Jung,</i> <i>The 2019 IEEE International Symposium on Workload Characterization</i>
DAC	FlashGPU: Placing New Flash Next to GPU Cores
Top Conference	<i>Jie Zhang, Miryeong Kwon, Hyojong Kim, Hyesoon Kim, Myoungsoo Jung,</i> <i>The 56th Design Automation Conference (DAC), 2019</i>
TPDS	Exploring Fault-Tolerant Erasure Codes for Scalable All-Flash Array Clusters
Top Journal	<i>Sungjoon Koh, Jie Zhang, Miryeong Kwon, Jungyeon Yoon, David Donofrio, Nam Sung Kim, Myoungsoo Jung,</i> <i>IEEE Transactions on Parallel and Distributed Systems (TPDS)</i>
NVMW	Addressing Fast-Detrapping for Reliable 3D NAND Flash Design
	<i>Mustafa Shihab, Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,</i> <i>10th Annual Non-Volatile Memories Workshop -- Nominated as Memorable Paper Award</i>
KCC	Maximizing GPU Cache Utilization with Adjustable Cache Line Management
	<i>Jie Zhang, Myoungsoo Jung,</i> <i>Korean Computer Congress (KCC), 2019 -- Excellent Paper Award</i>

2018

OSDI	FlashShare: Punching Through Server Storage Stack from Kernel to Firmware for Ultra-Low Latency SSDs
Top Conference	<i>Jie Zhang, Miryeong Kwon, Donghyun Gouk, Changlim Lee, Mohammad Alian, Myoungjun Chun, Mahmut Kandemir, Nam Sung Kim, Jihong Kim, Myoungsoo Jung,</i> <i>13th USENIX Symposium on Operating Systems Design and Implementation</i>

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MICRO	Amber: Enabling Precise Full-System Simulation with Detailed Modeling of All SSD Resources
<i>Top Conference</i>	<i>Donghyun Gouk, Miryeong Kwon, Jie Zhang, Sungjoon Koh, Wonil Choi, Nam Sung Kim, Mahmut Kandemir, Myoungsoo Jung,</i> <i>The 51st Annual IEEE/ACM International Symposium on Microarchitecture</i>
TACO	ReveNAND: A Fast-Drift Aware Resilient 3D NAND Flash Design
<i>Top Journal</i>	<i>Mustafa Shihab, Jie Zhang, Myoungsoo Jung, Mahmut Kandemir,</i> <i>ACM Transactions on Architecture and Code Optimization (TACO), 2018</i>
Eurosys	FlashAbacus: A Self-governing Flash-based Accelerator for Low-power Systems
<i>Top Conference</i>	<i>Jie Zhang, Myoungsoo Jung,</i> <i>The European Conference on Computer Systems (EuroSys), 2018</i>
IPDPS	CIAO: Cache Interference-Aware Throughput-Oriented Architecture and Scheduling for GPUs
	<i>Jie Zhang, Shuwen Gao, Nam Sung Kim, Myoungsoo Jung,</i> <i>32nd IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018</i>

2017

CAL	SimpleSSD: Modeling Solid State Drive for Holistic System Simulation
<i>Major Journal</i>	<i>Myoungsoo Jung, Jie Zhang, Ahmed Abulila, Miryeong Kwon, Narges Shahidi, John Shalf, Nam Sung Kim and Mahmut Kandemir,</i> <i>IEEE Computer Architecture Letters (CAL), 2017</i>
IISWC	Understanding System Characteristics of Online Erasure Coding on Scalable, Distributed and Large-Scale SSD Array Systems
	<i>Sungjoon Koh, Jie Zhang, Miryeong Kwon, Jungyeon Yoon, David Donofrio, Nam Sung Kim, Myoungsoo Jung,</i> <i>IEEE International Symposium on Workload Characterization (IISWC), 2017</i>
IISWC	TraceTracker: Hardware/Software Co-Evaluation for Large-Scale I/O Workload Reconstruction
	<i>Miryeong Kwon, Jie Zhang, Gyuyoung Park, Wonil Choi, David Donofrio, John Shalf, Mahmut Kandemir, Myoungsoo Jung,</i> <i>IEEE International Symposium on Workload Characterization (IISWC), 2017</i>
NPC	An In-depth Performance Analysis of Many-Integrated Core for Communication Efficient Heterogeneous Computing
	<i>Jie Zhang, Myoungsoo Jung,</i> <i>IFIP International Conference on Network and Parallel Computing (NPC), 2017</i>
IJPP	Enabling Realistic Logical Device Interface and Driver for NVM Express Enabled Full

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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**, Giese 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, Giese Park, David Donofrio, Mustafa Shihab, John Shalf and Myoungsoo Jung,

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

PACT-SRC

Integrating 3D Resistive Memory Cache into GPGPU for Energy-Efficient Data Processing

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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 Memory 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

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

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- 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

JIE ZHANG

tel: +8619910031394 jiez@pku.edu.cn

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- 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)
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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