JIE ZHANG

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申请人张杰，博士后，现年 30 岁 （出生于 1990 年），现任职于韩国先进科学院，出站时间为 2021 年 2 月。张杰博士目前从事存储系统和专用处理器的研究和设计，他的研究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，致力于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。

EDUCATION

KAIST, Daejeon, Korea — **Advisor:** Dr. Myoungsoo Jung
Postdoctoral Researcher — March 2020 – expected Feb 2021

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 — 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 – June 2012

PUBLICATIONS

Under review

HPCA **Ohm-GPU: Integrating New Optical Network and Heterogeneous Memory into GPU Multi-Processors**

HPCA **Revamping Storage Class Memory with Hardware Automated Memory-Over-Storage Solution**

FAST **Remedy: Rethinking the Reliability Techniques in Error-Prone Storage**

2020

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

CCF-A ***Jie Zhang**, Myoungsoo Jung,*
The IEEE/ACM International Symposium on Computer Architecture

FAST **Scalable Parallel Flash Firmware for Many-core Architectures**

CCF-A ***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**

CCF-A ***Jie Zhang**, Gyuyoung Park, David Donofrio, John Shalf, Myoungsoo Jung*
26th IEEE International Symposium on High-Performance Computer Architecture

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

*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**

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

Myoungsoo Jung

IEEE Computer Architecture Letters (CAL)

2019

HPCA
CCF-A

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

***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 SSDs

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

The 2019 IEEE International Symposium on Workload Characterization

DAC
CCF-A

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

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 -- Nominated as Excellent Paper Award

2018

OSDI
CCF-A

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
CCF-A

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
CCF-B

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

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

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CCF-B ***Jie Zhang**, Myoungsoo Jung,*

The European Conference on Computer Systems (EuroSys), 2018

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

CCF-B **GPUs**

***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**

*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**

CCF-C **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 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**

CCF-A *Hao Wang, **Jie Zhang**, Gieseo Park, Sharmila Shridhar, Myoungsoo Jung, Nam Sung Kim,*

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

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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**

*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 Fifth Workshop on Architecture and System for Big Data (ASBD), 2015

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

CCF-B ***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**

CCF-B **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**

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***Jie Zhang**, Myoungsoo Jung,*

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

EXPERIENCE

Research Assistant, Computer Architecture and Memory System Lab **Sep 2013 - Present**

- 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

- 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

- MICRO'18 '16
- HPCA'18 '16
- ASPLOS'19 '18 '17
- DATE'19
- IPDPS'18 '16
- ICCD'19 '18 '17 '15
- DAC'20 '19
- NVMSA'17 '16
- HotStorage'20

Invited Talks and Presentations

- 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

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- 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

Teaching Experience

- IIT 3002 Operating Systems (Fall’15)
- IIT 6036 Computer Organization and Design (Fall’15)
- IIT 7024 Advanced System Architecture (Fall’16)

Honors

- 2015 ACM Student Research Competition 2nd Runner Award
- 2018 OSDI travel grant
- 2020 HPCA travel grant