

JIE ZHANG

tel: +8201038363463jie@camelab.org

Solid background in operating system, computer architecture and storage system, proficient in C and C++, research on non-volatile memory, SSD, GPGPU and accelerators, well-organized and self-motivated to explore and research things.

Actively seeking jobs in the area of OS, computer architecture and storage system.

EDUCATION

KAIST, Daejeon, Korea

Postdoctoral Researcher

Yonsei University, Incheon, Korea

PhD in Engineering

University of Texas at Dallas, Richardson, Texas

PhD in Computer Engineering

University of Texas at Dallas, Richardson, Texas

Master of Science in Electrical Engineering

Advisor: Dr. Myoungsoo Jung

March 2020 – expected Feb 2021

Advisor: Dr. Myoungsoo Jung

August 2015 – Feb 2020

Advisor: Dr. Myoungsoo Jung

August 2014 – August 2015

Advisor: Dr. Myoungsoo Jung

August 2012 – May 2014

PUBLICATIONS

2020

- ISCA** **ZnG: Architecting GPU Multi-Processors with New Flash for Scalable Data Analysis**
Jie Zhang, Myoungsoo Jung,
The IEEE/ACM International Symposium on Computer Architecture
- FAST** **Scalable Parallel Flash Firmware for Many-core Architectures**
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**
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** **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**

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Latency SSDs

*Sungjoon 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

***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

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

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

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

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

The European Conference on Computer Systems (EuroSys), 2018

IPDPS

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

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

32nd IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018

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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 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**
Hao Wang, Jie Zhang, Gieseok 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**
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**

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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

***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 Characterization

***Jie Zhang**, Gieseok 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

***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

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.

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- Performance, power and thermal optimizations of solid state disk (SSD).
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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'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
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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
- 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

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- 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

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

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