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、英特尔学术英才计划荣誉学者、ACM SIGCSE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。负责和参与的项目得到了美国能源部、美国自然科学基金、韩国自然科学基金、三星电子、海力士、德州仪器和西部数据的累计超过3000万人民币的资助。他在国际会议及期刊上发表了40余篇论文，其中以第一作者发表论文22篇，包括计算机体系结构与系统顶级会议ISCA（CCF-A，两篇）、OSDI（CCF-A）、 HPCA（CCF-A，七篇）、 MICRO（CCF-A，两篇）、FAST（CCF-A）、DAC（CCF-A）、Eurosys（CCF-B）、PACT（CCF-B）以及权威期刊TPDS（CCF-A）、TACO（CCF-B）。

**工作经历**

**北京大学，**北京，中国 助理教授，博导

计算机学院 2021年7月–至今

**KAIST,** Daejeon, Korea 博后

Electrical Engineering (Computing Division) March 2020年3月 –2021年5月

**教育经历**

**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

**论文发表情况**

**2024**

**HPCA StreamPIM: Streaming Matrix Computation in Racetrack Memory**

***CCF-A*** *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*** *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*** *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*** *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 3区*** *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**

***CCF-A* 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**

***CCF-A* 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**

***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**

***CCF-C*** *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 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 FlashGPU: Placing New Flash Next to GPU Cores**

***CCF-A 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*** *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 -- Nominated as Excellent Paper Award*

**2018**

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

***CCF-A* 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* 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*** *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-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**

***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**

***CCF-C* Heterogeneous Computing**

***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* 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*

**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 5th 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**

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

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

**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 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)

**研究经历**

**Research Assistant, Computer Architecture and Memory System Lab 2013年9月 – 2021年5月**

* 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**

* 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
* MICRO’18 ’16

**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
* 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)

**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