

IPOOM JEONG | RESUME

- **Status:** Postdoctoral Research Associate at UIUC
- **Interests:** High-Performance and Energy-Efficient CPU/GPU Microarchitectures and Memory/Storage System Designs
- **Profile:** Accomplished and highly self-motivated Ph.D. with 10+ years of experience in computer system engineering. Rich experience in the design and verification of computer systems.
- **Website:** <https://ipoom-jeong.com/>



»»» Experience

2022.09 - Present **Postdoctoral Research Associate** [University of Illinois Urbana-Champaign, USA](#)

- Coordinated Science Lab (CSL)
- Principal Investigator (PI): Professor Nam Sung Kim
- Architectural Optimizations for Datacenters, CXL-Based Device Architectures, Smart-I/O Devices (SmartSSD, SmartNIC, etc.)

2021.09 - 2022.08 **Research Professor** [Yonsei University, Korea](#)

- BK21 Y-BASE R&E Institute, Department of Electrical and Electronic Engineering
- Energy-Efficient CPU/GPU Microarchitectures, Processing-in-Memory (PIM) Architectures

2020.03 - 2021.08 **Engineer/Staff Engineer** [Samsung Electronics, Korea](#)

- Advanced Solution Development Team, Memory Business
- CXL-Based Accelerator/Memory Expansion Device, SmartSSD 2.0 (Computational Storage Drive) SoC Architecture

2014.03 - 2020.02 **Graduate Research Assistant** [Yonsei University, Korea](#)

- Embedded Systems and Computer Architecture Lab (eSCaL)
- Advisor: Professor Won Woo Ro
- Energy-Efficient CPU/GPU Microarchitectures, Multi-Core Architectures

2014.03 - 2020.02 **Teaching Assistant** [Yonsei University, Korea](#)

- Undergraduate courses: Computer Architecture (EEE3530, 14-1st, 16-1st), Electrical and Electronic Engineering Experiments: Fundamentals (EEE2111, 14-2nd, 15-2nd), Graduation Research (15-1st)
- Graduate courses: Advanced Computer Architecture (E6501, 17-1st), System Design and Applications Lab (EEE6611, 18-1st, 18-2nd)

2013.08 - 2014.02 **Undergraduate Research Assistant** [Yonsei University, Korea](#)

- Embedded Systems and Computer Architecture Lab (eSCaL)
- Advisor: Professor Won Woo Ro
- Thesis: Exploiting Back-end Fusion in Multi-Core Processors

»»» Education

2014.03 - 2020.02 **Doctor of Philosophy** [Yonsei University, Korea](#)

- Department of Electrical and Electronic Engineering
- Dissertation: Energy-Efficient Instruction Scheduling Mechanisms for Out-of-Order Superscalar Processors

2010.03 - 2014.02 **Bachelor's Degree**

[Yonsei University, Korea](#)

- » Department of Electrical and Electronic Engineering
- » Graduation thesis: Exploiting Back-end Fusion in Multi-Core Processors

»» Scholarships and Awards

2021.11 **Encouragement Prize at the Outstanding Patent Award**

[SK Hynix](#)

- » Memory Device Including a Plurality of Area Having Different Refresh Periods, Memory Controller Controlling the Same and Memory System Including the Same
- » US patent, Registered in 2022.03.15 (Application No.: 16/988478, Registration No.: 11276452)

2020.02 **Bronze Prize at the 26th Samsung Humantech Paper Award**

[Samsung Electronics](#)

- » **Ipoom Jeong**, Seihoon Park
- » CASINO Core Microarchitecture: Generating Out-of-Order Schedules Using Cascaded In-Order Scheduling Windows

2019.11 **Excellent Graduate Researcher Scholarship**

[Yonsei University](#)

2018.02 **Encouragement Prize at the 24th Samsung Humantech Paper Award**

[Samsung Electronics](#)

- » **Ipoom Jeong**, Changmin Lee
- » Cg-CMT: Expanding Instruction Window via Coarse-Grained Instruction Commit

2010.03 - 2014.02 **National Scholarship for Science and Engineering**

[KOSAF](#)

»» Publications

2024.04 **TAROT: A CXL SmartNIC-Based Defense Against Multi-bit Errors by Row Hammer Attacks**

[International Conference](#)

- » Chihun Song, Michael Jaemin Kim, Tianchen Wang, Houxiang Ji, Jinghan Huang, **Ipoom Jeong**, Jaehyun Park, Hwayong Nam, Minbok Wi, Jung Ho Ahn, Nam Sung Kim
- » ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024, IF: 4, NRF BK21+)

2024.04 **A Quantitative Analysis and Guidelines of Data Streaming Accelerator in Modern Intel Xeon Scalable Processors**

[International Conference](#)

- » Reese Kuper, **Ipoom Jeong**, Yifan Yuan, Ren Wang, Narayan Ranganathan, Nikhil Rao, Jiayu Hu, Sanjay Kumar, Philip Lantz, Nam Sung Kim
- » ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024, IF: 4, NRF BK21+)

2024.04 **ScaleCache: A Scalable Page Cache for Multiple Solid-State Drives**

[International Conference](#)

- » Pham Tuan Kiet, Seokju Cho, Sang Jin Lee, Lan Anh Nguyen, Hyeongi Yeo, **Ipoom Jeong**, Sungjin Lee, Nam Sung Kim, Yongseok Son
- » ACM SIGOPS European Conference on Computer Systems (EuroSys 2024, IF: 2, NRF BK21+)

2024.01 **A Multi-DNN Acceleration Architecture for Balanced QoS and Throughput**

[International Conference](#)

- » **Ipoom Jeong**, Sungji Choi, Minjae Kim, Enhyeok Jang, Seokjin Go, Won Woo Ro
- » The 16th International Conference on Electronics, Information, and Communication (ICEIC 2024)

2023.11 **A Convertible Neural Processor Supporting Adaptive Quantization for Real-Time Neural Networks**

[International Journal](#)

- » Hongju Kal, Hyoseong Choi, **Ipoom Jeong**, Junsung Yang, Won Woo Ro
- » Journal of Systems Architecture (IF: 4.5, Q1, JCR2022)

2023.10 **Demystifying CXL Memory with Genuine CXL-Ready Systems and Devices** [International Conference](#)

- » Yan Sun, Yifan Yuan, Zeduo Yu, Reese Kuper, Chihun Song, Jinghan Huang, Houxiang Ji, Siddharth Agarwal, Jiaqi Lou, **Ipoom Jeong**, Ren Wang, Jung Ho Ahn, Tianyin Xu, Nam Sung Kim
- » The 56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2023, IF: 4, NRF BK21+)

2023.10 **INTERPRET: Inter-Warp Register Reuse for GPU Tensor Core** [International Conference](#)

- » Jae Seok Kwak, Myung Kuk Yoon, **Ipoom Jeong**, Seunghyun Jin, Won Woo Ro
- » The 32nd ACM International Conference on Parallel Architectures and Compilation Techniques (PACT 2023, IF: 3, NRF BK21+)

2023.08 **Triple-A: Early Operand Collector Allocation for Maximizing GPU Register Bank Utilization** [International Journal](#)

- » **Ipoom Jeong**, Eunbi Jeong, Nam Sung Kim, Myung Kuk Yoon
- » IEEE Embedded Systems Letters (IF: 1.6, Q3, JCR2022)

2023.07 **LADIO: Leakage-Aware Direct I/O for I/O-Intensive Workloads** [International Journal](#)

- » **Ipoom Jeong**, Jiaqi Lou, Yongseok Son, Yongjoo Park, Yifan Yuan, Nam Sung Kim
- » IEEE Computer Architecture Letters, Vol. 22, Issue 2, pp. 77 - 80, Jul - Dec. 2023 (IF: 2.3, Q3, JCR2022)

2022.12 **CASH-RF: A Compiler-Assisted Hierarchical Register File in GPUs** [International Journal](#)

- » Yunho Oh, **Ipoom Jeong**, Won Woo Ro, Myung Kuk Yoon
- » IEEE Embedded Systems Letters, Vol. 14, pp. 187 - 190, Dec. 2022 (IF: 1.6, Q3, JCR2022)

2022.10 **Reconstructing Out-of-Order Issue Queue** [International Conference](#)

- » **Ipoom Jeong**, Jiwon Lee, Myung Kuk Yoon, Won Woo Ro
- » The 55th IEEE/ACM International Symposium on Microarchitecture (MICRO 2022, IF: 4, NRF BK21+)

2022.08 **TEA-RC: Thread Context-Aware Register Cache for GPUs** [International Journal](#)

- » **Ipoom Jeong**, Yunho Oh, Won Woo Ro, Myung Kuk Yoon
- » IEEE Access, Vol. 10, pp. 82049 - 82062, Aug. 2022 (IF: 3.9, Q2, JCR2022)

2020.02 **CASINO Core Microarchitecture: Generating Out-of-Order Schedules Using Cascaded In-Order Scheduling Windows** [International Conference](#)

- » **Ipoom Jeong**, Seihoon Park, Changmin Lee, Won Woo Ro
- » The 26th IEEE International Symposium on High Performance Computer Architecture (HPCA 2020, IF: 4, NRF BK21+)

2019.12 **OverCome: Coarse-Grained Instruction Commit with Handover Register Renaming** [International Journal](#)

- » **Ipoom Jeong**, Changmin Lee, Keunsoo Kim, Won Woo Ro
- » IEEE Transactions on Computers, Vol. 68, Issue 12, pp. 1802-1816, Dec. 2019 (IF: 3.131, Q1, JCR2018)

2018.06 **Constructing Resilient Region in Dynamic Optimization Systems via Dynamic Adjustment of Bias Thresholds** [International Conference](#)

- » **Ipoom Jeong**, Won Woo Ro
- » The 3rd IEEE International Conference On Consumer Electronics Asia (ICCE-ASIA 2018)

2017.11	Parallel In-Order Execution Architecture for Low-Power Processor	International Conference
<ul style="list-style-type: none">» Kyungmin Lee, Ipoom Jeong, Won Woo Ro» The 14th International SoC Design Conference (ISOCC 2017)		
2017.01	Dynamic Warp Scheduler Selection Policy Using Linear Regression for GPUs	International Conference
<ul style="list-style-type: none">» Hyunjun Shin, Kyungmin Lee, Ipoom Jeong, Jong Hyun Park, Won Woo Ro» The 16th International Conference on Electronics, Information, and Communication (ICEIC 2017)		
2016.06	Heterogeneous Single Core with Functional Unit Gating for High Energy-Efficiency	Domestic Conference
<ul style="list-style-type: none">» Yoonsoo Kim, Ipoom Jeong, Won Woo Ro» 2016 Annual Summer Conference of IEIE		
2016.06	Analyzing Development Trends and Performance/Power Characteristics of Multi-Core Processors	Domestic Conference
<ul style="list-style-type: none">» Ipoom Jeong, Won Woo Ro» 2016 Annual Summer Conference of IEIE		
2014.11	Exploiting Back-End Fusion in Multi-Core Processors	Domestic Conference
<ul style="list-style-type: none">» Jonghyun Park, Ipoom Jeong, Won Woo Ro» 2014 Annual Fall Conference of KIPS		

»» Patents

2024.02	Storage system and method to perform workload associated with a host	Int'l/Dom Patent
<ul style="list-style-type: none">» Wonseob Jeong, Hee Hyun Nam, Younggeon Yoo, Jeongho Lee, Younho Jeon, Ipoom Jeong, Chanho Yoon» Registered in 2024.02.13 (Application No.: 17/742,184, Patent No.: 11,899,970)» CN: Applied in 2022.06.20 (Application No.: 202210699555.4)» KR: Applied in 2021.09.29 (Application No.: 10-2021-0128940)		
2023.11	System, device and method for indirect addressing	Int'l/Dom Patent
<ul style="list-style-type: none">» Jeongho Lee, Ipoom Jeong, Younggeon Yoo, Younho Jeon» US: Registered in 2023.11.07 (Application No.: 17/378,354, Patent No.: 11,809,341)» EP: Applied in 2021.07.23 (Application No.: 21187355.9)» CN: Applied in 2021.07.14 (Application No.: 202110795792.6)» KR: Applied in 2020.10.14 (Application No.: 10-2020-0132978)		
2023.08	Memory device including direct memory access engine, system including the memory device, and method of operating the memory device	Int'l/Dom Patent
<ul style="list-style-type: none">» Heehyun Nam, Jeongho Lee, Wonseob Jeong, Ipoom Jeong, Hyeokjun Choe» US: Registered in 2023.08.29 (Application No.: 17/368,981, Patent No.: 11,741,034)» CN: Applied in 2021.07.22 (Application No.: 202110832714.9)» DE: Applied in 2021.07.08 (Application No.: 10 2021 117 636.0)» KR: Applied in 2020.11.06 (Application No.: 10-2020-0148133)		
2023.02	System, device and method for accessing device-attached memory	Int'l/Dom Patent

- › Jeongho Lee, Heehyun Nam, Jaeho Shin, Hyodeok Shin, Younggeon Yoo, Younho Jeon, Wonseob Jeong, **Ipoom Jeong**, Hyeokjun Choe
- › US: **Registered in 2023.02.21** (Application No.: 17/380,805, Patent No.: 11,586,543)
- › EP: Applied in 2021.07.22 (Application No.: 21187164.5)
- › CN: Applied in 2021.07.14 (Application No.: 202110796960.3)
- › KR: Applied in 2020.10.15 (Application No.: 10-2020-0133743)

2022.12 **Memory Management Unit and Method of Walking Page Table** Domestic Patent

- › Jiwon Lee, Won Woo Ro, **Ipoom Jeong**, Hongju Kal, Gun Ko, Hyunwuk Lee
- › KR: Applied in 2022.12.15 (Application No.: 10-2022-0175909)

2022.07 **Apparatus and Method for Instruction Scheduling of High-Performance Out-of-Order Cores** Domestic Patent

- › Won Woo Ro, **Ipoom Jeong**
- › KR: Applied in 2022.07.15 (Application No.: 10-2022-0087365)

2022.04 **Neural Network Processing Method** Domestic Patent

- › Won Woo Ro, Hongju Kal, Cheonjun Park, Hyunwuk Lee, **Ipoom Jeong**, Jiwon Lee
- › KR: Applied in 2022.04.04 (Application No.: 10-2022-0041848)

2022.03 **Memory Device Including a Plurality of Area Having Different Refresh Periods, Memory Controller Controlling the Same and Memory System Including the Same** Int'l/Dom Patent

- › Won Woo Ro, Hyunwuk Lee, Gun Ko, **Ipoom Jeong**, Minseong Kim, Yongtag Song, Sungjae Lee
- › US: **Registered in 2022.03.15** (Application No.: 16/988,478, Patent No.: 11,276,452)
- › CN: Applied in 2020.08.27 (Application No.: 202010879009.X)
- › KR: Applied in 2020.04.14 (Application No.: 10-2020-0045023)

2021.08 **Apparatus and Method for Managing Physical Register File of High-Performance Out-of-Order Superscalar Cores** Domestic Patent

- › Won Woo Ro, **Ipoom Jeong**
- › KR: **Registered in 2021.08.17** (Application No.: 10-2020-0033669, Registration No.: 10-2292580)

2021.01 **Smart Storage Device** Domestic Patent

- › Hyeokjun Choe, Younho Jeon, Younggeon Yoo, Hyodeok Shin, **Ipoom Jeong**
- › KR: Applied in 2021.01.20 (Application No.: 10-2021-0007897)

2020.10 **Apparatus and Method for Managing Reorder Buffer of High-Performance Out-of-Order Superscalar Cores** Domestic Patent

- › Won Woo Ro, **Ipoom Jeong**
- › KR: **Registered in 2020.10.22** (Application No.: 10-2019-0146601, Registration No.: 10-2170966)

››› Projects

2020.09 - 2021.08 **SmartSSD 2.0: Developing Next-Generation Computational Storage Drive**

- › Research and development project at Samsung Electronics
- › Designing an SoC (System-on-Chip) for next-generation CSDs (Computational Storage Drives), A prototype was announced in Flash Memory Summit (FMS) 2022

2020.03 - 2020.08 **Developing CXL-Based Accelerator and Memory Expansion Device**

- » Research and development project at Samsung Electronics
- » Developing CXL (Compute eXpress Link) Type 2 accelerator and Type 3 memory expansion device by leveraging NAND flash

2019.02 - 2020.02 **Developing CPU-GPU Heterogeneous Computing Simulation Framework**

- » Research project at Yonsei University joint with SK Hynix
- » Developing a simulation framework for CPU-GPU heterogeneous computing that supports processing of the state-of-the-art deep learning algorithms

2018.07 - 2019.06 **Developing Energy-Efficient Approximate Memory for Neural Network Applications**

- » Research project at Yonsei University joint with SK Hynix
- » Exploring an energy-efficient approximate memory architecture for deep learning applications

2017.09 - 2018.08 **Developing Processor and Memory System for Next-Generation Security Platform**

- » Research project at Yonsei University joint with Samsung Electronics
- » Developing ASIPs (Application-Specific Instruction-Set Processors) for cryptographic algorithms (e.g., AES, SHA-256, and RSA-2048)

2015.07 - 2015.12 **Constructing a Verification Environment for Data Plane Acceleration and Performance Analysis**

- » Research project at Yonsei University joint with ETRI
- » Developing and verifying optimization techniques for improving data plane acceleration in virtualized network environment

2014.07 - 2017.11 **Developing Low-Power Mobile Computing Platform**

- » Research project at Yonsei University joint with LG Electronics
- » Inter- and Intra-core optimization techniques for higher energy efficiency of mobile APs (Application Processors)

»»» Activities

2023.06 - 2023.06 **Tutorial Organizer**

- » On-chip Accelerators in 4th Gen Intel® Xeon® Scalable Processors: Features, Performance, Use Cases, and Future!
- » 50th International Symposium on Computer Architecture (ISCA 2023)

2022.06 - 2022.06 **Conference Session Chair**

- » Artificial Intelligence Circuits and Systems (AICAS 2022)

2022.01 - Present **External Reviewer**

- » ACM Transactions on Architecture and Code Optimization (TACO)
- » IEEE Transactions on Emerging Topics in Computing (TETC)
- » Microprocessors and Microsystems