Ipoom Jeong · Hardware Engineer · Illinois, USA · **jip9110@gmail.com** · (US, +1) 217 778 8808 · (KR, +82) 10 9180 7008

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 **A Quantitative Analysis and Guidelines of Data Streaming Accelerator in Intel 4th Gen 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+)

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

- 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

- 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

- 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

- **Ipoom Jeong**, Won Woo Ro
- 2016 Annual Summer Conference of IEIE

2014.11 **Exploiting Back-End Fusion in Multi-Core Processors** Domestic Conference

- Jonghyun Park, **Ipoom Jeong**, Won Woo Ro
- 2014 Annual Fall Conference of KIPS

Patents

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

- Heehyun Nam, Jeongho Lee, Wonseb 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, Wonseb 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)

2022.06 **Memory device, memory device operating method, and electronic device including memory device** Int'l/Dom Patent

- Wonseb Jeong, Hee Hyun Nam, Younggeon Yoo, Jeongho Lee, Younho Jeon, **Ipoom Jeong**, Chanho Yoon
- CN: Applied in 2022.06.20 (Application No.: 202210699555.4)
- US: Applied in 2022.05.11 (Application No.: 17/742,184)
- KR: Applied in 2021.09.29 (Application No.: 10-2021-0128940)

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)

2021.07 **System, device and method for indirect addressing** Int'l/Dom Patent

- Jeongho Lee, **Ipoom Jeong**, Younggeon Yoo, Younho Jeon
- EP: Applied in 2021.07.23 (Application No.: 21187355.9)
- US: Applied in 2021.07.16 (Application No.: 17/378,354)
- CN: Applied in 2021.07.14 (Application No.: 202110795792.6)
- KR: Applied in 2020.10.14 (Application No.: 10-2020-0132978)

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