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# 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: http://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

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 Devices, SmartSSD 2.0

2014.03 - 2020.02 **Research Assistant** Yonsei University, Korea

- Embedded Systems and Computer Architecture Lab (esCaL)
- Advisor: Professor Won Woo Ro

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)

## 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** and 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** and Changmin Lee
- Cg-CMT: Expanding Instruction Window via Coarse-Grained Instruction Commit

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

## Publications

2022.12 **CASH-RF: A Compiler-Assisted Hierarchical Register File in GPUs** International Journal

- Yunho Oh, **Ipoom Jeong**, Won Woo Ro, and Myung Kuk Yoon
- IEEE Embedded Systems Letters, Volume: 14, pp. 187 - 190, Dec. 2022 (IF: 1.524, Q3, JCR2021)

2022.10 **Reconstructing Out-of-Order Issue Queue** International Conference

- **Ipoom Jeong**, Jiwon Lee, Myung Kuk Yoon, and 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, and Myung Kuk Yoon
- IEEE Access, Vol. 10, pp. 82049 - 82062, Aug. 2022 (IF: 3.476, Q2, JCR2021)

2020.02 **CASINO Core Microarchitecture: Generating Out-of-Order Schedules Using Cascaded In-Order Scheduling Windows** International Conference

- **Ipoom Jeong**, Seihoon Park, Changmin Lee, and 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, and 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** and 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**, and 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

- Hyunjune Shin, Kyungmin Lee, **Ipoom Jeong**, Jong Hyun Park, and 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**, and 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** and 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**, and Won Woo Ro
- 2014 Annual Fall Conference of KIPS

## Preprints / Work in Progress (SM: Submitted, UG: Under Going)

2023.05 **A Quantitative Analysis and Guideline of Data Streaming Accelerator in Intel 4th Gen Xeon Scalable Processors** Preprint

- Reese Kuper, **Ipoom Jeong**, Yifan Yuan, Jiayu Hu, Ren Wang, Narayan Ranganathan, and Nam Sung Kim
- arXiv Preprint

2023.04 **Demystifying CXL Memory with Genuine CXL-Ready Systems and Devices** Preprint

- Yan Sun, Yifan Yuan, Zeduo Yu, Reese Kuper, **Ipoom Jeong**, Ren Wang, and Nam Sung Kim
- arXiv Preprint

SM **LADIO: Leakage-Aware Direct I/O for I/O-Intensive Workloads** International Journal

- **Ipoom Jeong**, Jiaqi Lou, Yongseok Son, Yongjoo Park, Yifan Yuan, and Nam Sung Kim
- IEEE Computer Architecture Letters

SM **SOCA: Speculative Operand Collector Allocation for Maximizing GPU Register Bank Utilization** International Journal

- **Ipoom Jeong**, Eunbi Jeong, and Myung Kuk Yoon
- IEEE Embedded Systems Letters

SM **INTERPRET: Inter-Warp Register Reuse for GPU Tensor Core** International Conference

- Jae Seok Kwak, Myung Kuk Yoon, **Ipoom Jeong**, Seunghyun Jin, and Won Woo Ro
- 32nd International Conference on Parallel Architectures and Compilation Techniques (PACT 2023)

SM **Draco: An End-to-End Design for Sparse Neural Network Acceleration with Processing-in-Memory** International Conference

- Hongju Kal, Cheonjun Park, Hyunwuk Lee, Jiwon Lee, **Ipoom Jeong**, and Won Woo Ro
- 32nd International Conference on Parallel Architectures and Compilation Techniques (PACT 2023)

SM **CXL ≠ NUMA: Device-Specific Characteristics and Effective Use of True CXL Memory** 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, and Nam Sung Kim
- 56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2023)

SM **Pacemaker: Toward Energy-Efficient Speculative Execution** International Conference

- Jeonghoon Choi, **Ipoom Jeong**, and Won Woo Ro
- 56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2023)

SM **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, and Nam Sung Kim
- 20th USENIX Symposium on Networked Systems Design and Implementation (USENIX NSDI 2023)

SM **ScaleCache: A Scalable Page Cache for Multiple Solid-State Drives** International Conference

- Pham Tuan Kiet, Seokju Cho, Sang Jin Lee, Nguyen Lan Anh, Hyeongi Yeo, **Ipoom Jeong**, Sungjin Lee, Nam Sung Kim, and Yongseok Son
- European Conference on Computer Systems (EuroSys 2024)

UG **Stimpack: Convertible Neural Processor Supporting Adaptive Quantization for Real-Time Neural Network** International Journal

- Hongju Kal, Hyoseong Choi, **Ipoom Jeong**, Junsung Yang, and Won Woo Ro
- Journal of Systems Architecture (JSA 2023)

UG **STUDIO: Smart Sharing of Underutilized Last-Level Cache with Data Direct I/O** International Conference

- **Ipoom Jeong**, Jiaqi Lou, Yongseok Son, Yongjoo Park, Yifan Yuan, and Nam Sung Kim
- ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

UG **A Quantitative Analysis of Data Streaming Accelerator in Intel Sapphire Rapids Xeon Scalable Processors** International Conference

- Reese Kuper, **Ipoom Jeong**, Yifan Yuan, Jiayu Hu, Ren Wang, Narayan Ranganathan, and Nam Sung Kim
- ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

UG **ECHO: SmartNIC Enhancement for Energy-Efficient SmartNIC-Server Cooperative Heterogeneous Computing Under SLO Constraints** International Conference

- Jinghan Huang, Jiaqi Lou, Yifan Yuan, Xinhao Kong, Danyang Zhuo, **Ipoom Jeong**, and Nam Sung Kim
- ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

UG **USPS: Universal Predicate Pushdown to Smart Storage** International Conference

- **Ipoom Jeong**, Shadman Saqib Eusuf, Jinghan Huang, Guanshujie Fu, Nam Sung Kim, and Yongjoo Park
- International Conference on Very Large Data Bases (VLDB 2023)

UG **Dynamic Reconfigurable Core Microarchitecture for Energy-Efficient Exploitation of ILP and TLP** International Journal

- **Ipoom Jeong**, Myung Kuk Yoon, Won Woo Ro, and Nam Sung Kim
- IEEE Transactions on Computers

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## Patents

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

- Jiwon Lee, Won Woo Ro, **Ipoom Jeong**, Hongju Kal, Gun Ko, and Hyunwuk Lee
- 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

- **Ipoom Jeong** and Won Woo Ro
- Applied in 2022.07.15 (Application no: 10-2022-0087365)

2022.04 **Neural Network Processing Method Including Memory Optimization Techniques** Domestic Patent

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

2021.09 **Memory Device, Operating Method of Memory Device, and Electronic Device Including Memory Memory Device** Domestic Patent

- Won Seob Jeong, Heehyun Nam, Younggeon Yoo, Jeongho Lee, Younho Jeon, **Ipoom Jeong**, and Chanho Yoon
- Applied in 2021.09.29 (Application no: 10-2021-0128940)

2021.01 **Smart Storage Device** Domestic Patent

- Hyeokjun Choe, Younho Jeon, Younggeon Yoo, Hyodeok Shin, and **Ipoom Jeong**
- Applied in 2021.01.20 (Application no: 10-2021-0007897)

2020.11 **Memory Device Including Direct Memory Access Engine, System Having the Same and Operating Method of Memory Device** Domestic Patent

- Heehyun Nam, Jeongho Lee, Won Seob Jeong, **Ipoom Jeong**, and Hyeokjun Choe
- Applied in 2020.11.06 (Application no: 10-2020-0148133)

2020.10 **System, Device, and Method for Accessing Device-Attached Memory** Domestic Patent

- Jeongho Lee, Heehyun Nam, Jaeho Shin, Hyodeok Shin, Younggeon Yoo, Younho Jeon, Won Seob Jeong, **Ipoom Jeong**, and Hyeokjun Choe
- Applied in 2020.10.15 (Application no: 10-2020-0133743)

2020.10 **System, Device, and Method for Indirect Addressing** Domestic Patent

- Jeongho Lee, **Ipoom Jeong**, Younggeon Yoo, and Younho Jeon
- Applied in 2020.10.14 (Application no: 10-2020-0132978)

2020.08 **Memory Device Including a Plurality of Area Having Different Refresh Periods, Memory Controller Controlling the Same and Memory System Including the Same** International Patent

- Won Woo Ro, Hyunwuk Lee, Gun Ko, **Ipoom Jeong**, Minseong Kim, Yongtag Song, and Sungjae Lee
- Registered in 2022.03.15 (Application no: 16/988478, Registration no: 11276452)

2020.04 **Memory Device Including a Plurality of Area Having Different Refresh Periods, Memory Controller Controlling the Same and Memory System Including the Same** Domestic Patent

- Won Woo Ro, Hyunwuk Lee, Gun Ko, **Ipoom Jeong**, Minseong Kim, Yongtag Song, and Sungjae Lee
- Applied in 2020.04.14 (Application no: 10-2020-0045023)

2020.03 **Apparatus and Method for Managing Physical Register File of High-Performance Out-or-Order Superscalar Cores** Domestic Patent

- **Ipoom Jeong** and Won Woo Ro
- Registered in 2021.08.17 (Application no: 10-2020-0033669, Registration no: 10-2292580)

2019.11 **Apparatus and Method for Managing Reorder Buffer of High-Performance Out-or-Order Superscalar Cores** Domestic Patent

- **Ipoom Jeong** and Won Woo Ro
- 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
- 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)

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 2022 (AICAS 2022)

2022.01 - Present **External Reviewer**

- IEEE Transactions on Emerging Topics in Computing (TETC), 2022, 2023
- Microprocessors and Microsystems, 2022