

# IPOOM JEONG | RESUME

- » **Status:** Assistant Professor at Yonsei University
- » **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

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| 2024.03 - Present  | <b>Assistant Professor</b>              | Yonsei University, Korea                     |
| <ul style="list-style-type: none"><li>» Department of System Semiconductor Engineering</li><li>» School of Electrical and Electronic Engineering</li></ul>   |   |  |
| 2022.09 - 2024.02  | <b>Postdoctoral Research Associate</b>  | University of Illinois Urbana-Champaign, USA |
| <ul style="list-style-type: none"><li>» Coordinated Science Lab (CSL)</li><li>» Principal Investigator (PI): Professor Nam Sung Kim</li><li>» Architectural Optimizations for Datacenters, CXL-Based Device Architectures, Smart-I/O Devices (SmartSSD, SmartNIC, etc.)</li></ul>  |   |  |
| 2021.09 - 2022.08  | <b>Research Professor</b>               | Yonsei University, Korea                     |
| <ul style="list-style-type: none"><li>» BK21 Y-BASE R&amp;E Institute, Department of Electrical and Electronic Engineering</li><li>» Energy-Efficient CPU/GPU Microarchitectures, Processing-in-Memory (PIM) Architectures</li></ul>   |   |  |
| 2020.03 - 2021.08  | <b>Engineer/Staff Engineer</b>          | Samsung Electronics, Korea                   |
| <ul style="list-style-type: none"><li>» Advanced Solution Development Team, Memory Business</li><li>» CXL-Based Accelerator/Memory Expansion Device, SmartSSD 2.0 (Computational Storage Drive) SoC Architecture</li></ul>   |   |  |
| 2014.03 - 2020.02  | <b>Graduate Research Assistant</b>      | Yonsei University, Korea                     |
| <ul style="list-style-type: none"><li>» Embedded Systems and Computer Architecture Lab (eSCaL)</li><li>» Advisor: Professor Won Woo Ro</li><li>» Energy-Efficient CPU/GPU Microarchitectures, Multi-Core Architectures</li></ul>   |   |  |
| 2014.03 - 2020.02  | <b>Teaching Assistant</b>               | Yonsei University, Korea                     |
| <ul style="list-style-type: none"><li>» Undergraduate courses: Computer Architecture (EEE3530, 14-1st, 16-1st), Electrical and Electronic Engineering Experiments: Fundamentals (EEE2111, 14-2nd, 15-2nd), Graduation Research (15-1st)</li><li>» Graduate courses: Advanced Computer Architecture (E6501, 17-1st), System Design and Applications Lab (EEE6611, 18-1st, 18-2nd)</li></ul> |   |  |
| 2013.08 - 2014.02  | <b>Undergraduate Research Assistant</b> | Yonsei University, Korea                     |
| <ul style="list-style-type: none"><li>» Embedded Systems and Computer Architecture Lab (eSCaL)</li><li>» Advisor: Professor Won Woo Ro</li><li>» Thesis: Exploiting Back-end Fusion in Multi-Core Processors</li></ul>   |   |  |

## »»» 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

2024.11      **Demystifying a CXL Type-2 Device and Unlocking Its Potential for Heterogeneous Computing**      [International Conference](#)

- » Houxiang Ji, Srikar Vanavasam, Yifan Yuan, Qirong Xia, Yang Zhou, Jinghan Huang, Yan Sun, Ren Wang, Pekon Gupta, Bhushan Chitlur, **Ipoom Jeong**, Nam Sung Kim
- » The 56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2024, IF: 4, NRF BK21+)

2024.06      **Intel Accelerators Ecosystem: An SoC-Oriented Perspective**      [International Conference](#)

- » Yifan Yuan, Ren Wang, Narayan Ranganathan, Nikhil Rao, Sanjay Kumar, Philip Lantz, Vivekananthan Sanjeevan, Jorge Cabrera, Atul Kwatra, Rajesh Sankaran, **Ipoom Jeong**, Nam Sung Kim
- » IEEE/ACM International Symposium on Computer Architecture (ISCA 2024, IF: 4, NRF BK21+)

2024.06      **HAL: Hardware-assisted Load Balancing for Energy-efficient SNIC-Host Cooperative Computing**      [International Conference](#)

- » Jinghan Huang, Jiaqi Lou, Srikar Vanavasam, Xinhao Kong, Houxiang Ji, **Ipoom Jeong**, Eun Kyung Lee, Danyang Zhuo, Nam Sung Kim
- » IEEE/ACM International Symposium on Computer Architecture (ISCA 2024, IF: 4, NRF BK21+)

2024.06      **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)

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, Hyeonggi 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+)

2023.07 **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 **Analyzing Development Trends and Performance/Power Characteristics of Multi-Core Processors**

[Domestic Conference](#)

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

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

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

2024.02	<b>Storage system and method to perform workload associated with a host</b>	<a href="#">Int'l/Dom Patent</a>
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» Wonseob Jeong, Hee Hyun Nam, Younggeon Yoo, Jeongho Lee, Younho Jeon, <b>Ipoom Jeong</b> , Chanho Yoon		
» US: <b>Registered in 2024.02.13</b> (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	<b>System, device and method for indirect addressing</b>	<a href="#">Int'l/Dom Patent</a>
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» Jeongho Lee, <b>Ipoom Jeong</b> , Younggeon Yoo, Younho Jeon		
» US: <b>Registered in 2023.11.07</b> (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	<b>Memory device including direct memory access engine, system including the memory device, and method of operating the memory device</b>	<a href="#">Int'l/Dom Patent</a>
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» Heehyun Nam, Jeongho Lee, Wonseob Jeong, <b>Ipoom Jeong</b> , Hyeokjun Choe		
» US: <b>Registered in 2023.08.29</b> (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	<b>System, device and method for accessing device-attached memory</b>	<a href="#">Int'l/Dom Patent</a>
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» Jeongho Lee, Heehyun Nam, Jaeho Shin, Hyodeok Shin, Younggeon Yoo, Younho Jeon, Wonseob Jeong, <b>Ipoom Jeong</b> , Hyeokjun Choe		
» US: <b>Registered in 2023.02.21</b> (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	<b>Memory Management Unit and Method of Walking Page Table</b>	<a href="#">Int'l/Dom Patent</a>
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» Jiwon Lee, Won Woo Ro, <b>Ipoom Jeong</b> , Hongju Kal, Gun Ko, Hyunwuk Lee		
» US: Applied in 2023.11.05 (Application No.: 18/502,058)		
» KR: Applied in 2022.12.15 (Application No.: 10-2022-0175909)		
2022.07	<b>Apparatus and Method for Instruction Scheduling of High-Performance Out-of-Order Cores</b>	<a href="#">Domestic Patent</a>
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» Won Woo Ro, <b>Ipoom Jeong</b>		
» KR: Applied in 2022.07.15 (Application No.: 10-2022-0087365)		
2022.04	<b>Neural Network Processing Method</b>	<a href="#">Domestic Patent</a>
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» Won Woo Ro, Hongju Kal, Cheonjun Park, Hyunwuk Lee, <b>Ipoom Jeong</b> , Jiwon Lee		
» KR: Applied in 2022.04.04 (Application No.: 10-2022-0041848)		
2022.03	<b>Memory device including a plurality of area having different refresh periods, memory controller controlling the same and memory system including the same</b>	<a href="#">Int'l/Dom Patent</a>

- » 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: **Registered in 2024.03.26** (Application No.: 202010879009.X, Patent No.: ZL 2020 11090146.1)
- » 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

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- » 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

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- » 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

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- » Artificial Intelligence Circuits and Systems (AICAS 2022)

2022.01 - Present

### External Reviewer

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