

# 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, Hyeonggi 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 **Stimpack: Convertible Neural Processor Supporting Adaptive Quantization for Real-Time Neural Network** [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, 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)

2022.06 **Memory device, memory device operating method, and electronic device including memory device** [Int'l/Dom Patent](#)

- › Wonseob 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	<b>Neural Network Processing Method</b>	Domestic Patent
<ul style="list-style-type: none"> <li>» Won Woo Ro, Hongju Kal, Cheonjun Park, Hyunwuk Lee, <b>Ipoom Jeong</b>, Jiwon Lee</li> <li>» KR: Applied in 2022.04.04 (Application No.: 10-2022-0041848)</li> </ul>		
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>	Int'l/Dom Patent
<ul style="list-style-type: none"> <li>» Won Woo Ro, Hyunwuk Lee, Gun Ko, <b>Ipoom Jeong</b>, Minseong Kim, Yongtag Song, Sungjae Lee</li> <li>» US: <b>Registered in 2022.03.15</b> (Application No.: 16/988,478, Patent No.: 11,276,452)</li> <li>» CN: Applied in 2020.08.27 (Application No.: 202010879009.X)</li> <li>» KR: Applied in 2020.04.14 (Application No.: 10-2020-0045023)</li> </ul>		
2021.08	<b>Apparatus and Method for Managing Physical Register File of High-Performance Out-of-Order Superscalar Cores</b>	Domestic Patent
<ul style="list-style-type: none"> <li>» Won Woo Ro, <b>Ipoom Jeong</b></li> <li>» KR: <b>Registered in 2021.08.17</b> (Application No.: 10-2020-0033669, Registration No.: 10-2292580)</li> </ul>		
2021.07	<b>System, device and method for indirect addressing</b>	Int'l/Dom Patent
<ul style="list-style-type: none"> <li>» Jeongho Lee, <b>Ipoom Jeong</b>, Younggeon Yoo, Younho Jeon</li> <li>» EP: Applied in 2021.07.23 (Application No.: 21187355.9)</li> <li>» US: Applied in 2021.07.16 (Application No.: 17/378,354)</li> <li>» CN: Applied in 2021.07.14 (Application No.: 202110795792.6)</li> <li>» KR: Applied in 2020.10.14 (Application No.: 10-2020-0132978)</li> </ul>		
2021.01	<b>Smart Storage Device</b>	Domestic Patent
<ul style="list-style-type: none"> <li>» Hyeokjun Choe, Younho Jeon, Younggeon Yoo, Hyodeok Shin, <b>Ipoom Jeong</b></li> <li>» KR: Applied in 2021.01.20 (Application No.: 10-2021-0007897)</li> </ul>		
2020.10	<b>Apparatus and Method for Managing Reorder Buffer of High-Performance Out-of-Order Superscalar Cores</b>	Domestic Patent
<ul style="list-style-type: none"> <li>» Won Woo Ro, <b>Ipoom Jeong</b></li> <li>» KR: <b>Registered in 2020.10.22</b> (Application No.: 10-2019-0146601, Registration No.: 10-2170966)</li> </ul>		

## »» Projects

2020.09 - 2021.08	<b>SmartSSD 2.0: Developing Next-Generation Computational Storage Drive</b>
<ul style="list-style-type: none"> <li>» Research and development project at Samsung Electronics</li> <li>» Designing an SoC (System-on-Chip) for next-generation CSDs (Computational Storage Drives), A prototype was announced in Flash Memory Summit (FMS) 2022</li> </ul>	
2020.03 - 2020.08	<b>Developing CXL-Based Accelerator and Memory Expansion Device</b>
<ul style="list-style-type: none"> <li>» Research and development project at Samsung Electronics</li> <li>» Developing CXL (Compute eXpress Link) Type 2 accelerator and Type 3 memory expansion device by leveraging NAND flash</li> </ul>	
2019.02 - 2020.02	<b>Developing CPU-GPU Heterogeneous Computing Simulation Framework</b>
<ul style="list-style-type: none"> <li>» Research project at Yonsei University joint with SK Hynix</li> <li>» Developing a simulation framework for CPU-GPU heterogeneous computing that supports processing of the state-of-the-art deep learning algorithms</li> </ul>	
2018.07 - 2019.06	<b>Developing Energy-Efficient Approximate Memory for Neural Network Applications</b>

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

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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)

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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

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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)

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**»» Activities**

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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)

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2022.06 - 2022.06      **Conference Session Chair**

- » Artificial Intelligence Circuits and Systems (AICAS 2022)

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2022.01 - Present      **External Reviewer**

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