

# 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** 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

2023.06 **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, Accepted

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)

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, Mar. 2022 (IF: 1.524, Q3, 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 / Ongoing Work (SR: Submitted and Under Review, WIP: Work in Progress)

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

**SR**    **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 (ESL 2023)

**SR**    **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)

**SR**    **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)

**SR**    **CXL  $\neq$  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)

**SR**    **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)

**SR**    **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)

**SR**    **ScaleCache: A Scalable Page Cache for Multiple Solid-State Drives**    [International Conference](#)

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

**WIP**    **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
- » Target: Journal of Systems Architecture (JSA 2023)

**WIP**    **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
- » Target: ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

**WIP**    **USPS: Universal Predicate Pushdown to Smart Storage**    [International Conference](#)

- » **Ipoom Jeong**, Shadman Saqib Eusuf, Jinghan Huang, Guanshujie Fu, Nam Sung Kim, and Yongjoo Park
- » Target: ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

**WIP**    **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
- » Target: ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

**WIP**    **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
- › Target: ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

WIP **Dynamic Reconfigurable Core Microarchitecture for Energy-Efficient Exploitation of ILP and TLP** [International Conference](#)

- › **Ipoom Jeong**, Myung Kuk Yoon, Won Woo Ro, and Nam Sung Kim
- › Target: International Symposium on Computer Architecture (ISCA 2024)

WIP **ZeReco: Toward Zero Recovery Latency Microarchitecture** [International Conference](#)

- › Reese Kuper, **Ipoom Jeong**, and Nam Sung Kim
- › Target: International Symposium on Computer Architecture (ISCA 2024)

## ››› 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, 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**, 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**, 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**, 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, **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**, 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**, 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, 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, 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, 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-of-Order Superscalar Cores**

[Domestic Patent](#)

- › **Ipoom Jeong**, 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-of-Order Superscalar Cores**

[Domestic Patent](#)

- › **Ipoom Jeong**, 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
- › 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**

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- » 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 2022 (AICAS 2022)

2022.01 - Present      **External Reviewer**

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