Jinwoo Choi

Contact Information

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Research Interests

Architecture and system optimization for neural networks /
Computer architecture, system software, and hardware acceleration
On-device machine learning, Scheduling, Neural Processing Unit (NPU), Performance Modeling

Education

Yonsei University, Seoul, Korea,
Ph.D. Candidate, Computer Science **Mar. 2020 - August. 2025**

- Advisor: Prof. Youngsok Kim

B.S., Computer Science **Mar. 2015 - Feb. 2020**

Research Experience

Post Doctoral Researcher **Sep. 2025 - Present**
Visual Intelligence Group (VIG) (Center for AI, Korea Institute of Science and Technology (KIST))

Graduate Researcher **Mar. 2020 - Aug. 2025**
Advisor: Prof. Youngsok Kim (High Performance Computing Platforms Lab, Yonsei University)

Undergraduate Researcher **Oct. 2019 - Feb. 2020**
Advisor: Prof. Youngsok Kim (High Performance Computing Platforms Lab, Yonsei University)

Undergraduate Researcher **Jun. 2018 - Oct. 2019**
Advisor: Prof. Hojung Cha (Mobile Embedded Systems Lab, Yonsei University)

Publications

Chaemin Lim, Suhyun Lee, **Jinwoo Choi**, Joonsung Kim, Jinho Lee, and Youngsok Kim, "FaScalSQL: A Fast and Scalable GPU-Accelerated SQL Query Engine for Out-of-Memory Tables", In *Proc. 42nd IEEE International Conference on Data Engineering (**ICDE**)*, May. 2026 (to appear).

Chaemin Lim, Suhyun Lee, **Jinwoo Choi**, Joonsung Kim, Jinho Lee, and Youngsok Kim, "DMO-DB: Mitigating the Data Movement Bottlenecks of GPU-Accelerated Relational OLAP", In *Proc. 34th International Conference on Parallel Architectures and Compilation Techniques (**PACT**)*, Nov. 2025 (to appear).

Suhyun Lee, Chaemin Lim, **Jinwoo Choi**, Heelim Choi, Chan Lee, Yongjun Park, Kwanghyun Park, Hanjun Kim, and Youngsok Kim, "SPID-Join: A Skew-resistant Processing-in-DIMM Join Algorithm Exploiting the Bank- and Rank-level Parallelisms of DIMMs", In *Proc. 2025 ACM International Conference on Management of Data (**SIGMOD**)*, June 2025.

Jinwoo Choi[1], Yeonan Ha[1], Hanna Cha, Seil Lee, Sungchul Lee, Jounghoo Lee, Shin-haeng Kang, Bongjun Kim, Hanwoong Jung, Hanjun Kim and Youngsok Kim, "MPC-Wrapper: Fully Harnessing the Potential of Samsung Aquabolt-XL HBM2-PIM on FPGAs", In *Proc. 32nd IEEE International Symposium On Field-Programmable Custom Computing Machines (**FCCM**)*, May. 2024.
[1]Co-first authors

Jinwoo Choi, Yeonan Ha, Jounghoo Lee, Sangsu Lee, Jinho Lee, Hanhwi Jang, and Youngsok Kim, "Enabling Fine-Grained Spatial Multitasking on Systolic-Array NPUs Using Dataflow Mirroring", *IEEE Transactions on Computers (**TC**)*, Aug. 2023

Chaemin Lim, Suhyun Lee, **Jinwoo Choi**, Jounghoo Lee, Seongyeon Park, Hanjun Kim, Jinho Lee, and Youngsok Kim, "Design and Analysis of a Processing-in-DIMM Join Algorithm: A Case Study with UPMEM DIMMs", In *Proc. 2023 ACM International Conference on Management of Data (**SIGMOD**)*, June 2023.

Jinwoo Choi[1], Jaeyeon Kim[1], Chaemin Lim[1], Suhyun Lee, Jinho Lee, Dokyung Song, and Youngsok Kim, "GuardiaNN: Fast and Secure On-Device Inference in TrustZone Using Embedded SRAM and Cryptographic Hardware", In Proc. *23rd ACM/IFIP International Middleware Conference (**Middleware**)*, Nov. 2022.
[1]Co-first authors

Jounghoo Lee[1], **Jinwoo Choi**[1], Jaeyeon Kim, Jinho Lee, and Youngsok Kim, "Dataflow Mirroring: Architectural Support for Highly Efficient Fine-Grained Spatial Multitasking on Systolic-Array NPUs", In *58th ACM/IEEE Design Automation Conference (**DAC**)*, Dec. 2021.
[1]Co-first authors

Patents

[**Registration: KR 1020200144563**] Youngsok Kim, **Jinwoo Choi**, Jounghoo Lee, "Method and Apparatus for Performing Deep Learning Operations", *Korea Patent*

[**Registration: JP 2023129058**] Youngsok Kim, **Jinwoo Choi**, Chaemin Lim, Suhyun Lee, Dokyung Song, Jinho Lee, "Artificial Intelligence Device Based on Trust Environment", *Japan Patent*

Projects

Exploring Quality-Aware NN Scheduler **Mar. 2024 - Aug. 2025**
- LG Electronics
- Project Leader

Designing a PIM-Based NPU Architecture and FPGA Prototyping **Mar. 2023 - Feb. 2024**
- Samsung Advanced Institute of Technology (SAIT)
- Project Leader

Sparsity-Aware Spatial Multitasking NPU Architecture and Scheduling **Jun. 2022 - May 2023**
- National Research Foundation of Korea (NRF)
- Project Leader

Developing Software Platform for Programming of PIM **Jun. 2021 - Dec. 2023**
- Institute for Information & communications Technology Promotion (IITP)
- Project Leader

Smart, Attack-resistant IoT Networks **Dec. 2020 - Nov. 2023**
- Korea Institute for Advancement of Technology (KIAT)
- Research Assistant

Spatial Multitasking on Systolic Array Neural Processing Units **Mar. 2020 - Feb. 2021**
- Samsung Advanced Institute of Technology (SAIT)
- Project Leader

Awards and Honors

Best Paper - Yonsei University Innovation Paper Award **Jul. 2023**
- Yonsei University Graduate School

Fellowship from NRF of Korea **May 2022**
- National Research Foundation (NRF) of Korea
- 1-year tuition

Skills

Programming Languages
- C, C++, Python

Tools
- Deep Learning Frameworks (TensorFlow, TensorFlow Lite, MACE)

- Simulators (SCALE-SIM, DRAMSim3, OpenRoad Flow, Accelergy, CACTI-7)

Languages

- Korean(native), English