Jeongmin Shin
Smartphone R&D 1Team
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EDUCATION

Ulsan National Institute of Science and Technology (UNIST) *(Full-Scholarship)* — Ulsan, South Korea
M.S, Electrical Engineering — Aug. 2022 ~ Aug. 2024

- Advisor: Kyuho Jason Lee
- Research Interest: A low Power 3D point matching processor with low volume of external memory access (EMA) and on-chip data transaction
  - HW-SW co-design
  - Eliminating EMA by using memory allocation prediction schemes
  - PIM architect to support searching/clustering in-memory with low volume of on-chip data transaction
  - A low power 3D point clouds matching processor in mobile environments
  - Digital Custom IP Design

Kwangwoon University (KW) — Seoul, South Korea
B.S, Computer Engineering — Mar. 2016 ~ Feb.2020

PROFESSIONAL EXPERIENCE

Engineer in Samsung Electronics, Mobile eXperience (MX) Division — **Jul. 2024 ~ Present**

- AP technical team for Galaxy S26
  - Validation and performance analysis for Samsung LSI's AP

Teaching Assistance in Electrical Engineering, UNIST

- 2022 Digital Logic and Laboratory
  - Digital circuit design in Simulation & FPGA level
- 2024 VLSI Design
  - Digital circuit design using Synopsys Design Compiler, IC Compiler for P&R, Samsung 28nm

IT Specialist & Signal Officer in Republic of Korea (ROK) Army — **Mar. 2020 ~ June.2022**

- IT Specialist Officer in ROK Army Logistics Command — Nov. 2020 ~ June. 2022
  - Army Logistics Data Management using SQL
- Dispatched to ROK-US Combined Forces Command — Jul. 2021 ~ Aug. 2021
  - Battle simulation in ROK-US Combined Commander Training (CCPT)

KW-LG Electronics

- Internship at LG Electronics, Yangjae R&D Campus — Jan. 2019 ~ Feb. 2019
- Industry-university Collaborative Project (KW-LG Electronics) — Oct. 2018 ~ May. 2019
  - Built C software framework for a mobile web browser blocking harmful sites

PUBLICATIONS

Journal Papers

- *C^2IM-NN: A Low-power 3D Point Clouds Matching Processor with 1D-CNN Prediction and CAM-based In-memory kNN Searching,* IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I)
  Jeongmin Shin, Hoichang Jeong, Seungbin Kim, Keonhee Park, Sangho Lee, and Kyuho Lee
- *A 701.7 TOPS/W Compute-in-Memory Processor With Time-Domain Computing for Spiking Neural Network,* IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I)
  Keonhee Park, Hoichang Jeong, Seungbin Kim, **Jeongmin Shin,** and Kyuho Lee
- *An Energy-Efficient Processor for Real-Time Semantic LiDAR SLAM in Mobile Robots,* IEEE Journal of Solid-State Circuits (JSSC)
  Jueun Jung, Seungbin Kim, Bokyoung Seo, Wuyoung Jang, Sangho Lee, **Jeongmin Shin**, Donghyeon Han, and Kyuho Jason Lee
- *HYTEC: Compact and Energy-Efficient Analog-Digital Hybrid CIM With Transpose Ternary eDRAM,* IEEE Journal of Solid-State Circuits (JSSC)
  Hoichang Jeong, Seungbin Kim, **Jeongmin Shin,** and Kyuho Jason Lee

Conference Papers

- *A Low-power 3D Point Clouds Matching Processor with 1D-CNN Prediction and CAM-based In-memory kNN Searching,* 2024 IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS)
  Jeongmin Shin, Hoichang Jeong, Seungbin Kim, Keonhee Park, Sangho Lee, and Kyuho Lee
- *A 0.81 mJ/frame, Real-time LiDAR Odometry and Mapping Processor with Memory-efficient kNN and Reconfigurable Architecture,* 2024 IEEE European Solid-State Electronics Research Conference (ESSERC)
  Seungbin Kim, **Jeongmin Shin**, Sangho Lee, Jueun Jung, and Kyuho Jason Lee
- *A 273.48 TOPS/W and 1.58 Mb/mm2 Analog-Digital Hybrid CIM Processor with Transpose Ternary-eDRAM Bitcell,* 2024 IEEE Asian Solid-State Circuits Conference (A-SSCC)
  Hoichang Jeong, Seungbin Kim, **Jeongmin Shin**, Keonhee Park, and Kyuho Jason Lee
- *LSPU: A Fully-Integrated Real-Time LiDAR-SLAM SoC with Point-Neural-Network Segmentation and Multi-level kNN Acceleration,* 2024 IEEE International Solid-State Circuits Conference (ISSCC)
  Jueun Jung, Seungbin Kim, Bokyoung Seo, Wuyoung Jang, Sangho Lee, **Jeongmin Shin**, Donghyeon Han, and Kyuho Jason Lee

MAJOR RESEARCH EXPERIENCE

ML/AI Algorithm

- Online incremental learning support vector machine (an industry-university collaboration project between LG Electronics and Kwangwoon Univ.)
- Invented 1D-convolution neural network (CNN) using temporal and spatial locality in 3D point clouds to predict memory allocation through the number of points in each partitioned space (TCAS-I)
- Invented an on-chip clustering algorithm considering data distribution (TCAS-I)
- Developed an algorithm to track the memory allocation through the hash page-based memory management in every frame of LiDAR sensors (ISSCC'24)

System-on-Chip Design

- Processing in-memory (PIM) architect of 3D point matching processor with content addressable memory (CAM) based in-memory k-nearest neighbor (kNN) Searching (TCAS-I)
- System architect of 3D point matching processor with hash page-based memory management unit (ISSCC'24)
- Participated in the design of 3 MPWs (Multi Project Wafer) over 2 years
- Digtial Custom IP design

Computer Architecture

- 5-stage pipeline 32-bit RISC core including full hazard handling (structural, data, and control), verification with verilog testbench simulation

AWARDS

- **Demonstration Session Award, IEEE ISSCC 2024** — Feb. 2025
- **Best Student Paper Award, IEEE AICAS 2024** — April. 2024
- Full Scholarship for Graduate Student (M.S.) — Aug. 2022 ~ Aug. 2024
- Republic of Korea Army Headquarters Deputy Chief of Staff for Logistics Award — Dec. 2021
- Most Improved Student Award, Software Convergence University, KW — Sep. 2018

SKILLS

- Programming Languages: Verilog HDL, C/C++
- EDA Tools: Synopsys Design Compiler, IC Compiler for P&R

LANGUAGES

- Competent in English