

Jihwan Oh

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Research Interests

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- Hardware-software co-design and cross-layer optimization for efficient computing
 - Heterogeneous architectures, energy-efficient systems, and specialized accelerators

Education

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- **Korea Advanced Institute of Science and Technology (KAIST)** Feb. 2019 – Feb. 2026
B.S. in Electrical Engineering (Primary Major), Computer Science (Double Major)
GPA: 4.07/4.3, *Summa Cum Laude (expected)*; Dean's List: Spring 2019, Spring 2024
 - **Georgia Institute of Technology** Jan. 2025 – Jul. 2025
Exchange Program, School of Electrical and Computer Engineering; GPA: 4.0/4.0
 - **Chungbuk Science High School** Mar. 2017 – Feb. 2019
Selected for Early Admission to KAIST

Publications

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- Characterizing Compute–Communication Overlap in GPU-Accelerated Distributed Deep Learning: Performance and Power Implications** May. 2025
Seonho Lee, *Jihwan Oh*, Junkyum Kim, Seokjin Go, Jongse Park, Divya Mahajan
Poster presented at ISPASS 2025, arXiv:2507.03114
- GPU-Aware Collective Communication Protocols Leveraging the TMA Unit to Mitigate Compute–Communication Overlap Overheads** (In progress)
Jihwan Oh, Seokjin Go, Junkyum Kim, Jongse Park, Divya Mahajan

Research Experience

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- Systems Infrastructure and Architecture Research Lab, Georgia Tech** Jan. 2025 – Present
Undergraduate Researcher (Advisor: Prof. Divya Mahajan)
 - Characterized the performance impact of compute–communication overlap in large-scale distributed LLM training, evaluating execution-time and power implications under various parallelism configurations.
 - Led a project to identify the root causes of compute–communication overlap overheads hidden at the software level through hardware-level analysis. Proposed a new NCCL (NVIDIA Collective Communication Library) protocol leveraging NVIDIA’s novel hardware unit, the Tensor Memory Accelerator (TMA), to optimize the data path and mitigate these overheads.
- Computer Architecture and Systems Lab, KAIST** Sep. 2024 – Dec. 2024
Individual Researcher (Advisor: Prof. Jongse Park)
 - Conducted a study based on *NeuPIMs* (ASPLOS 2024), exploring workload balancing strategies to mitigate performance degradation in heterogeneous NPU–PIM systems.
 - Participated in research optimizing quantization operations on Processing-in-Memory (PIM) architectures to improve computational efficiency.
- Urban Robotics Lab, KAIST** May. 2024 – Jun. 2024
Individual Researcher (Advisor: Prof. Hyun Myung)
 - Implemented SLAM algorithms and ROS-based path planning systems for mobile robotics.
- Robotics and Computer Vision Lab, KAIST** Jul. 2020 – Dec. 2020
Individual Researcher (Advisor: Prof. In So Kweon)
 - Conducted a project to enhance the performance of *Sign Language Transformers* (CVPR 2020) by leveraging pseudo-labeling techniques to improve translation accuracy.

Teaching and Professional Experience

CS.10001: Introduction to Programming, KAIST , Teaching Assistant	Sep. 2025 – Present
Yulmae Academy , Programming Instructor	Dec. 2023 – Dec. 2024
– Taught C, Python, and introductory machine learning to science high school students.	
CS.93000: Immersion Camp (Coding Camp), KAIST , Teaching Assistant	Aug. 2023 – Feb. 2024
Republic of Korea Air Force , Software Developer	Aug. 2021 – May. 2023
– Developed and refactored a VR flight-training system using Unreal Engine 4 and C++, improving realism and training efficiency.	
– Collaborated with a small team of developers using Git for version control and incorporated feedback from real pilots to refine the simulator.	

Academic Activities

Poster Presentation , ISPASS 2025 – Ghent, Belgium	May. 2025
– Presented poster on “Characterizing Compute–Communication Overlap in GPU-Accelerated Distributed Deep Learning”.	
Attendee , ISCA 2025 and uArch Workshop – Tokyo, Japan	Jun. 2025
– Selected as a full travel grant recipient to attend ISCA 2025 and participate in the uArch Workshop.	

Awards and Scholarships

• Next-Generation Engineer Award	2025
Institute for Promotion of Engineering and Science of Korea (IPESK)	
• Undergraduate Architecture Mentoring Workshop Travel Grant	2025
7th uArch Workshop / ISCA 2025	
• Student Travel Grant , IEEE ISPASS 2025	2025
• Dean's List , School of Electrical Engineering, KAIST	2024
• Korea–U.S. Student Exchange Program Scholarship , KIAT	2024
• National Science and Technology Scholarship , Korea Government	2022 – 2024
• Dean's List , Freshman Division, KAIST	2019
• Minister of Education Award , Ministry of Education (STEAM R&E Program)	2018

Leadership and Extracurricular Activities

KAIST Buddy Program	2025
– Supported incoming international students by facilitating academic and cultural onboarding	
ICISTS , Public Relations Head	2019 – 2021
– Designed and executed PR campaigns for the student-led startup conference <i>GRAFFITI</i>	
– Coordinated founders' talks and project-based sessions, bridging industry and academia	
– Grew attendance to 150+ participants through targeted outreach and branding	
Summer Mentoring Camp , Rural Education Initiative	2019
– Planned and delivered on-site STEM lessons and career mentoring sessions for middle school students in rural Korea	

Technical Skills

• Programming Languages: C/C++, Python, Rust, SystemVerilog, Verilog
• Libraries and Tools: CUDA, PyTorch, NCCL, CUTLASS, cuBLAS; Megatron-LM, Megatron-DeepSpeed; Nsight Compute, Nsight Systems; Unreal Engine 4, Git