

Minkyun Seo

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EDUCATION

Seoul National University (SNU)

Integrated Ph.D. Program in Computer Science and Engineering

Sep. 2025 – Present

Seoul, Republic of Korea

- Advised by Prof. Jaesik Park at the Visual & Geometric Intelligence Lab (GPA: 4.07/4.3)

Seoul National University (SNU)

B.S. in Architectural Engineering, Computer Science and Engineering

Mar. 2019 – Aug. 2025

Seoul, Republic of Korea

- **Summa Cum Laude**, GPA: 3.93/4.3 (cumulative), 4.01/4.3 (CSE major)
- **Best BS Thesis Award**: Towards Zero-Shot Point Cloud Registration across Diverse Environments
- Jul. 2021 – Jan. 2023: Absence for mandatory military service

Sejong Science High School

Specialized High School for Gifted Students in Science and Mathematics

Mar. 2016 – Feb. 2019

Seoul, Republic of Korea

RESEARCH INTEREST

- **Geometric Feature Learning, 3D Reconstruction, 3D Vision for Robotics Applications**

PUBLICATIONS

1. Hyungtae Lim^{*}, **Minkyun Seo^{*}**, Luca Carlone, Jaesik Park[†], “Towards Zero-Shot Point Cloud Registration Across Diverse Scales, Scenes, and Sensor Setups”, *arXiv preprint*, 2026
2. **Minkyun Seo^{*}**, Hyungtae Lim^{*}, Kanghee Lee, Luca Carlone, Jaesik Park[†], “BUFFER-X: Towards Zero-Shot Point Cloud Registration in Diverse Scenes”, *Int. Conf. on Computer Vision (ICCV)*, 2025 (**Highlight**) [code]

RESEARCH EXPERIENCE

Visual & Geometric Intelligence Lab (PI: Jaesik Park) | SNU

Graduate Student Researcher

Sep. 2025 – Present

Seoul, Republic of Korea

- Extended BUFFER-X to object-scale registration and heterogeneous sensor configurations (e.g., Ouster OS0-128 to Velodyne VLP-16)
- Proposed BUFFER-X-Lite, an efficient variant with early-exit strategies and fast pose solvers, reducing computation time by 43% while preserving registration accuracy
- Investigating cross-session map matching for multi-session localization and navigation using learned geometric descriptors

Visual & Geometric Intelligence Lab (PI: Jaesik Park) | SNU

Research Intern

Dec. 2023 – Aug. 2025

Seoul, Republic of Korea

- Curated 11 benchmark datasets spanning indoor/outdoor environments, 6 geographic sites, 12 sensor types, and scales from 3.5m to 240m
- Developed a zero-shot point cloud registration pipeline with adaptive voxel sizing and search radii, enabling robust cross-domain generalization without retraining

AIoT Lab (PI: Hyung-Sin Kim) | SNU

Research Intern

Jun. 2023 – Sep. 2023

Seoul, Republic of Korea

- Built ES-Studio, a controlled real-world studio for data collection with adjustable environmental lighting and camera sensor parameters
- Conducted preliminary experiments on covariate shifts across environmental and sensor domains

PROJECTS

- [P1] **Inference Optimization for LFM2-8B-A1B** Oct. 2025 – Dec. 2025
- Implemented large-batch inference using pipeline parallelism, micro-batching, and MPI-based multi-GPU model parallelism, overlapping communication and computation
 - Optimized GPU execution by developing custom CUDA kernels with tiling and fusion, and designing slot-based memory management with asynchronous streams and buffer reuse to eliminate dynamic allocations
- [P2] **FastMRI Challenge, SNU** Jun. 2024 – Sep. 2024
- Scaled up VarNet-based MRI reconstruction models under limited GPU memory using mixed-precision training, gradient accumulation, and gradient checkpointing
- [P3] **Drone-Based 3D Reconstruction of SNU Lecture Hall** Apr. 2024 – Jun. 2024
- Reconstructed a 3D mesh model of the Lecture Hall at SNU from images captured using a drone
 - Analyzed conditions leading to poor 3D reconstruction outcomes, emphasizing the need for methods that address the limitations of real-world data collection
- [P4] **Department Office Chatbot** May. 2024
- Developed an administrative support chatbot using RAG with the Meta-Llama-3-8B-Instruct model
 - Integrated a diffusion model to provide contextualized responses with enhanced user experience
- [P5] **Avatar Texture Enhancement via 3D Patch-wise Loss** Sep. 2023 – Dec. 2023
- Improved avatar texture reconstruction by introducing a 3D patch-wise SSIM loss that captures local structural consistency and mitigates dominant color oversaturation caused by L1 loss

AWARDS AND SCHOLARSHIPS

- ICCV 2025 Highlight Paper** Oct. 2025
- Graduate Research Fellowship | DB Group** Sep. 2025 – Present
- National Excellence Scholarship | Korea Student Aid Foundation** Mar. 2021 – Jun. 2024
- Full tuition awarded to the top-performing students in science and engineering across the nation
- Merit-based Scholarship | SNU** Sep. 2019 – Feb. 2021, Jul. 2024 – Dec. 2024

SKILLS

Language: Korean (Native), English (Fluent)
Programming Languages: Python, C/C++, Java, Javascript, RISC-V
Frameworks/Misc: Pytorch, Pytorch3D, Open3D, CUDA, Diffusers, LangChain, Git, Verilog
3D Tools: Rhinoceros 3D, AutoCAD, Solidworks, Meshlab, MeshRoom, Blender