Minkyun Seo

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Education

Seoul National University (SNU) Sep. 2025 – Present
Integrated Ph.D. Program in Computer Science and Engineering Seoul, Republic of Korea

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

Seoul National University (SNU) Mar. 2019 – Aug. 2025
B.S. in Architectural Engineering, Computer Science and Engineering 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 Mar. 2016 – Feb. 2019
Specialized High School for Gifted Students in Science and Mathematics 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 Sep. 2025 – Present
Graduate Student Researcher Seoul, Republic of Korea

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

Visual & Geometric Intelligence Lab (PI: Jaesik Park) | SNU Dec. 2023 – Aug. 2025
Research Intern Seoul, Republic of Korea

- Curated 11 datasets covering diverse indoor and outdoor environments, sensor modalities, and scales
- Developed a zero-shot point cloud registration pipeline that adaptively selects voxel size and search radii, enabling robust generalization across diverse scenes without retraining

AIoT Lab (PI: Hyung-Sin Kim) | SNU Jun. 2023 – Sep.2023
Research Intern Seoul, Republic of Korea

- Contributed to early-stage research on Covariate Shifts in Environment and Sensor Domain
- Built ES-Studio, a controlled real-world studio for data collection with adjustable environmental lighting and camera sensor parameters

Projects

[P1] Inference Optimization for LFM2-8B-A1B MoE Models 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