

Byeonghyun Pak

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Research Interest

My research interest lies at the intersection of computer vision and robotics. Particularly, I focus on developing a unified representation that jointly models dynamic 3D geometry and open-world semantics. I believe this is fundamental for generalization to unseen environments and successful execution of complex, long-horizon tasks.

Education

Daegu Gyeongbuk Institute of Science and Technology (DGIST) <i>B.S. in Engineering (Interdisciplinary Program)</i> <ul style="list-style-type: none">Concentration in Computer Science & Engineering	Feb 2019 – Feb 2023 <i>Daegu, South Korea</i>
University of California, Berkeley (UCB) <i>Visiting Student (Freshman Global Leadership Program)</i>	Jul 2019 – Aug 2019 <i>Berkeley, CA, USA</i>

Publications

*: Equal Contribution, C: Conference, P: Preprint

[P1] **Title Anonymized for Double-Blind Review** (Topics: Vision-Language Models, Visual Grounding)

Byeongju Woo, Zilin Wang, **Byeonghyun Pak**, Sangwoo Mo, Stella X. Yu

Submitted to International Conference on Learning Representations (ICLR), 2026

[C3] **Tortoise and Hare Guidance: Accelerating Diffusion Model Inference with Multirate Integration**

Yunhee Lee, **Byeonghyun Pak**, Junwha Hong, Hoseong Kim

Neural Information Processing Systems (NeurIPS), 2025

[C2] **Textual Query-Driven Mask Transformer for Domain Generalized Segmentation**

Byeonghyun Pak*, Byeongju Woo*, Sunghwan Kim*, Dae-hwan Kim, Hoseong Kim

European Conference on Computer Vision (ECCV), 2024

[C1] **B-spline Texture Coefficients Estimator for Screen Content Image Super-Resolution**

Byeonghyun Pak*, Jaewon Lee*, Kyong Hwan Jin

Computer Vision and Pattern Recognition (CVPR), 2023 — **Highlight paper (top 2.5%)**

Work/Research Experience

Republic of Korea Army (ROKA) <i>First Lieutenant (attached to Agency for Defense Development)</i> <ul style="list-style-type: none">Selected as one of 20 research officers nationwide dedicated to STEM research for national defensePlanned and executed EO/IR field data collections enabling reliable IR detection evaluation	Mar 2023 – Present <i>Daejeon, South Korea</i>
Agency for Defense Development <i>Research Officer for National Defense (ROND)</i> <ul style="list-style-type: none"><i>Project: Synthetic-to-Real Domain Generalization for Military Object Detection</i><ul style="list-style-type: none">Researched domain generalization for reliable infrared imagery object detection in data-scarce settingsImproved synthetic-to-real robustness by integrating pre-trained vision-language models (VLMs)1 Publication in ECCV 2024 [project page]	Mar 2023 – Present <i>Daejeon, South Korea</i>

- *Project: Synthetic Dataset Generation for Air Defense System*
 - Constructed synthetic datasets for rare/low-visibility targets via **image/video diffusion models**
 - Accelerated the generation pipeline by $\approx 30\%$ with a novel multi-rate integration method
 - 1 Publication in NeurIPS 2025 [[project page](#)]

Image Processing Laboratory @ DGIST

Dec 2021 – Feb 2023

Undergraduate Research Intern (advisor: Prof. Kyong Hwan Jin)

Daegu, South Korea

- Researched **implicit neural representations (INRs)** for solving **inverse problems** (e.g., super-resolution)
- *Project: Image Super-resolution for Screen-Content Images*
 - Developed INR-based super-resolution with emphasis on screen-content characteristics and edge fidelity
 - Built a **B-spline INR-based SR pipeline** specialized for screen content
 - 1 Publication in CVPR 2023 (Selected as highlight paper) [[project page](#)]

Honor & Awards

Korea National Scholarship of Excellence in Science and Technology

Mar 2021 – Feb 2023

- National selection: 1 of 20 Research Officers nationwide (1 of 4 in CSE) for defense STEM research

Korea National Scholarship for Undergraduate Study

Mar 2019 – Feb 2023

- Received national scholarship includes full tuition and stipend

Korea Military Academy Superintendent's Award

Dec 2021

- Award for Excellence in National Defense Research Projects
- *Topic: A Study on the Application of Attention Module for Object Tracking Performance Improvement*

1st Place—FriendlyAI LLM Hackathon

May 2024

- *Topic: Knowledge Graph-based RAG (Retrieval-Augmented Generation) model*

Patents

B. Pak et al., System for B-Spline Texture Coefficient Estimation and Method for Generating High-Resolution Images Using the Same. **KR 10-2730236** (reg. 2024.11.11).

Academic Services

Conference Reviewer

- Neural Information Processing Systems (**NeurIPS**) 2025
- Computer Vision and Pattern Recognition (**CVPR**) 2026

Skills

Programming Languages: Python, C/C++, JavaScript, MATLAB

Frameworks & Tools: PyTorch, TensorFlow, NumPy, Docker, Git, OpenCV, OpenGL, Open3D, ManiSkill