Byeonghyun Pak

Location: Daejeon, South Korea | **Email:** byeonghyun.pak@gmail.com | **Website:** byeonghyunpak.github.io

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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) Mar 2019 – Feb 2023
B.S. in Engineering (Interdisciplinary Program) *Daegu, South Korea*

- Concentration in Computer Science & Engineering

University of California, Berkeley (UCB) Jul 2019 – Aug 2019
Visiting Student (Freshman Global Leadership Program) *Berkeley, CA, USA*

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**
Yunghee 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) Mar 2023 – Present
First Lieutenant (attached to Agency for Defense Development) *Daejeon, South Korea*

- Selected as one of 20 research officers nationwide dedicated to STEM research for national defense
- Planned and executed EO/IR field data collections enabling reliable IR detection evaluation

Agency for Defense Development Mar 2023 – Present
Research Officer for National Defense (ROND) *Daejeon, South Korea*

- *Project: Synthetic-to-Real Domain Generalization for Military Object Detection*
  - Researched domain generalization for reliable infrared imagery object detection in data-scarce settings
  - Improved synthetic-to-real robustness by integrating pre-trained **vision–language models (VLMs)**
  - 1 Publication in ECCV 2024 [project page]

- *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 ≈**30%** with a novel multi-rate integration method
  - 1 Publication in NeurIPS 2025

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—FriendliAI 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

References

Prof. Kyong Hwan Jin, Associate Professor at Korea Univ.
- Email: kyong_jin@korea.ac.kr

Dr. Eunjin Koh, Principal Researcher at ADD
- Email: eikoda@add.re.kr

Dr. Hoseong Kim, Senior Researcher at ADD
- Email: hoseongkim@add.re.kr