

# Byeonghyun Pak

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## Research Interest

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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

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<b>Daegu Gyeongbuk Institute of Science and Technology (DGIST)</b>	Feb 2019 – Feb 2023
<i>B.S. in Engineering (Interdisciplinary Program)</i>	<i>Daegu, South Korea</i>
• Concentration in Computer Science & Engineering	
<b>University of California, Berkeley (UCB)</b>	Jul 2019 – Aug 2019
<i>Visiting Student (Freshman Global Leadership Program)</i>	<i>Berkeley, CA, USA</i>

## Publications

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\*: 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

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<b>Republic of Korea Army (ROKA)</b>	Mar 2023 – Present
<i>First Lieutenant (attached to Agency for Defense Development)</i>	<i>Daejeon, South Korea</i>
• 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	

<b>Agency for Defense Development</b>	Mar 2023 – Present
<i>Research Officer for National Defense (ROND)</i>	<i>Daejeon, South Korea</i>

• 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  $\approx 30\%$  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

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<b>Korea National Scholarship of Excellence in Science and Technology</b>	Mar 2021 – Feb 2023
• National selection: 1 of 20 Research Officers nationwide (1 of 4 in CSE) for defense STEM research	
<b>Korea National Scholarship for Undergraduate Study</b>	Mar 2019 – Feb 2023
• Received national scholarship includes full tuition and stipend	
<b>Korea Military Academy Superintendent's Award</b>	Dec 2021
• Award for Excellence in National Defense Research Projects	
• Topic: <i>A Study on the Application of Attention Module for Object Tracking Performance Improvement</i>	
<b>1st Place—FriendliAI LLM Hackathon</b>	May 2024
• Topic: <i>Knowledge Graph-based RAG (Retrieval-Augmented Generation) model</i>	

## Patents

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*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

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### Conference Reviewer

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

## Skills

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

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