

# 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)**

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**

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)**

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  $\approx 30\%$  with a novel multi-rate integration method
  - 1 Publication in NeurIPS 2025

## Image Processing Laboratory @ DGIST

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

Dec 2021 – Feb 2023

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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### 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

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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

## Skills

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

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

## References

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**Prof. Kyong Hwan Jin**, Associate Professor at Korea Univ.

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**Dr. Eunjin Koh**, Principal Researcher at ADD

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**Dr. Hoseong Kim**, Senior Researcher at ADD

- Email: [hoseongkim@add.re.kr](mailto:hoseongkim@add.re.kr)