

SEUNGYEON KIM

Seoul, South Korea

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<https://seungyeon-k.github.io>

RESEARCH INTERESTS

- **Inductive bias for 3D recognition.** Developing recognition systems that incorporate inductive bias to reconstruct complete 3D object shapes from partial visual observations for robust and effective robotic manipulation.
- **Equivariant models for generalizable skill learning.** Leveraging equivariant architectures to improve data efficiency and generalization in various robot manipulation tasks, including dynamics learning and skill transfer.
- **Low-dimensional representations for adaptive robot agent.** Discovering compact trajectory representations to simplify high-dimensional control problems and enable fast adaptation to environmental changes.

EDUCATION

Seoul National University

Ph. D. in Mechanical Engineering

Advisor: Frank C. Park

Thesis: [Learning for Vision-Based Object Manipulation: A Shape Recognition-Based Approach](#)

Honors: *Outstanding Doctoral Dissertation Award*

Sep 2019 - Feb 2024

GPA: 4.15 / 4.3

Seoul National University

M. S. in Mechanical Engineering

Advisor: Frank C. Park / work closely with Sang-Hoon Yeo

Thesis: On the Encoding Capacity of Human Motor Adaptation

Mar 2017 - Feb 2019

GPA: 4.22 / 4.3

Seoul National University

B. S. in Mechanical Engineering, Minor in Economics

Honors: *Summa Cum Laude*

Mar 2013 - Feb 2017

GPA: 3.91 / 4.3 (Major 4.02 / 4.3)

Gyeonggibuk Science High School

One-year early graduation

Mar 2011 - Feb 2013

EXPERIENCE

Robotics Laboratory, Seoul National University

BK21 Postdoctoral Research Fellow

May 2024 - Present

Institute of Advanced Machines and Design (IAMD)

Researcher in Intelligent Machine System Research Department

Sep 2021 - Apr 2024

Institute of Advanced Machines and Design (IAMD)

Assistant Researcher in Intelligent Machine System Research Department

Apr 2019 - Aug 2019

PUBLICATIONS

[C6] ScrewSplat: An End-to-End Method for Articulated Object Recognition

Seungyeon Kim, Junsu Ha, Young Hun Kim, Yonghyeon Lee, Frank C. Park

Conference on Robot Learning (CoRL), 2025

[P1] DreamGrasp: Zero-Shot 3D Multi-Object Reconstruction from Partial-View Images for Robotic Manipulation

Young Hun Kim, **Seungyeon Kim**, Yonghyeon Lee, Frank C. Park

arXiv, 2025

- [J4] Motion Manifold Flow Primitives for Task-Conditioned Trajectory Generation under Complex Task-Motion Dependencies
Yonghyeon Lee, Byeongho Lee, **Seungyeon Kim**, Frank C. Park
IEEE Robotics and Automation Letters (RA-L), 2025
- [J3] Diverse Policy Learning via Random Obstacle Deployment for Zero-Shot Adaptation
Seokjin Choi*, Yonghyeon Lee*, **Seungyeon Kim**, Che-Sang Park, Himchan Hwang, Frank C. Park
IEEE Robotics and Automation Letters (RA-L), 2025
- [C5] T²SQNet: A Recognition Model for Manipulating Partially Observed Transparent Tableware Objects
Young Hun Kim*, **Seungyeon Kim***, Yonghyeon Lee, Frank C. Park
Conference on Robot Learning (CoRL), 2024
- [C4] Leveraging 3D Reconstruction for Mechanical Search on Cluttered Shelves
Seungyeon Kim*, Young Hun Kim*, Yonghyeon Lee, Frank C. Park
Conference on Robot Learning (CoRL), 2023
- [C3] Equivariant Motion Manifold Primitives
Byeongho Lee*, Yonghyeon Lee*, **Seungyeon Kim**, MinJun Son, Frank C. Park
Conference on Robot Learning (CoRL), 2023
- [C2] SE(2)-Equivariant Pushing Dynamics Models for Tabletop Object Manipulations
Seungyeon Kim, Byeongdo Lim, Yonghyeon Lee, Frank C. Park
Conference on Robot Learning (CoRL), **Oral presentation (33/504 = 6.5%)**, 2022
- [J2] DSQNet: A Deformable Model-Based Supervised Learning Algorithm for Grasping Unknown Occluded Objects
Seungyeon Kim*, Taegyun Ahn*, Yonghyeon Lee, Jihwan Kim, Michael Y. Wang, Frank C. Park
IEEE Transactions on Automation Science and Engineering (T-ASE), 2022
- [C1] A Statistical Manifold Framework for Point Cloud Data
Yonghyeon Lee*, **Seungyeon Kim***, Jinwon Choi, Frank C. Park
International Conference on Machine Learning (ICML), 2022
- [J1] On the Encoding Capacity of Human Motor Adaptation
Seungyeon Kim, Jaewoon Kwon, Jin-Min Kim, Frank C. Park, Sang-Hoon Yeo
Journal of Neurophysiology (JNP), 2021

PROJECTS

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- | | |
|---|------------------------------|
| Object Grasping and Manipulation Skills for Stable Housekeeping Service | <i>Sep 2021 - Oct 2022</i> |
| <i>Project Leader</i> | <i>with Samsung Research</i> |
| <ul style="list-style-type: none"> • Develop prehensile and non-prehensile manipulation skills for handling various tableware objects on the table, as part of household tasks [C2]. | |
| Deep Learning-based Lane Detection Algorithm from LiDAR data | <i>Apr 2021 - Oct 2021</i> |
| <i>Project Leader</i> | <i>with Seoul Robotics</i> |
| <ul style="list-style-type: none"> • Develop a deep neural network architecture that recognizes 3D lane information from LiDAR data. | |
| Artificial Intelligence-based Automated Painting Robot System | <i>Oct 2020 - Sep 2021</i> |
| <i>Project Member</i> | <i>with Doolim-Yaskawa</i> |
| <ul style="list-style-type: none"> • Develop an artificial intelligence-based smart painting robot automation system for automobile factories, primarily responsible for visualizing painting results. | |
| Babymind: Infant-Mimic Neurocognitive Developmental Machine Learning | <i>Apr 2019 - Dec 2020</i> |
| <i>Project Leader</i> | <i>with SNU-AIIS</i> |
| <ul style="list-style-type: none"> • Build infant-mimicking neurocognitive AI technologies for robot manipulation in real-world environments. Conduct research on human motion primitives [J1] and baby-inspired grasping skills [J2]. | |

Deep Reinforcement Learning Algorithm for Industrial Robot

Project Leader

Apr 2018 - Dec 2018

with Samsung Electronics

- Develop a safe and efficient reinforcement learning algorithm for high-gain position controller-based industrial robots.

TEACHING EXPERIENCE

Geometric Methods for High-Dimensional Data Analysis (*M3239.006800*)

Fall 2022

Teaching Assistant in Seoul National University

Dynamics (*446.204A*)

Fall 2018

Teaching Assistant in Seoul National University

Introduction to Robotics (*M2794.0027*)

Spring 2017

Teaching Assistant in Seoul National University

Basic Calculus 1 (*033.016*)

Spring 2015

Undergraduate Student Instructor in Seoul National University

Basic Calculus 2 (*033.017*)

Fall 2014

Undergraduate Student Instructor in Seoul National University

REFERENCES

Frank C. Park (*fcp@snu.ac.kr*)

Professor, Mechanical Engineering, Seoul National University

Sang-Hoon Yeo (*s.yeo@bham.ac.uk*)

Lecturer, School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham

Last updated: March 24, 2025