

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 <i>Ph. D. in Mechanical Engineering</i> Advisor: Frank C. Park Thesis: Learning for Vision-Based Object Manipulation: A Shape Recognition-Based Approach Honors: <i>Outstanding Doctoral Dissertation Award</i>	<i>Sep 2019 - Feb 2024</i> GPA: 4.15 / 4.3
Seoul National University <i>M. S. in Mechanical Engineering</i> Advisor: Frank C. Park / work closely with Sang-Hoon Yeo Thesis: On the Encoding Capacity of Human Motor Adaptation	<i>Mar 2017 - Feb 2019</i> GPA: 4.22 / 4.3
Seoul National University <i>B. S. in Mechanical Engineering, Minor in Economics</i> Honors: <i>Summa Cum Laude</i>	<i>Mar 2013 - Feb 2017</i> GPA: 3.91 / 4.3 (Major 4.02 / 4.3)
Gyeonggibuk Science High School One-year early graduation	<i>Mar 2011 - Feb 2013</i>

RESEARCH EXPERIENCE

GeoRob Lab, KTH Royal Institute of Technology Postdoctoral Researcher (<i>Advisor: Noémie Jaquier</i>)	<i>Oct 2025 - Present</i>
Robotics Laboratory, Seoul National University BK21 Postdoctoral Research Fellow (<i>Advisor: Frank C. Park</i>)	<i>May 2024 - Sep 2025</i>
Institute of Advanced Machines and Design (IAMD) Researcher in Intelligent Machine System Research Department	<i>Sep 2021 - Apr 2024</i>
Institute of Advanced Machines and Design (IAMD) Assistant Researcher in Intelligent Machine System Research Department	<i>Apr 2019 - Aug 2019</i>
School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham Visiting Researcher (<i>Host: Sang-Hoon Yeo</i>)	<i>Jan 2019</i>

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), **Oral presentation (42/738 = 5.7%)**, 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

- Object Grasping and Manipulation Skills for Stable Housekeeping Service** *Sep 2021 - Oct 2022*
Project Leader *with Samsung Research*
• 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** *Apr 2021 - Oct 2021*
Project Leader *with Seoul Robotics*
• 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>
• 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>
• 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	<i>Apr 2018 - Dec 2018</i>
<i>Project Leader</i>	<i>with Samsung Electronics</i>
• 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)	<i>Fall 2022</i>
Teaching Assistant in Seoul National University	
Dynamics (446.204A)	<i>Fall 2018</i>
Teaching Assistant in Seoul National University	
Introduction to Robotics (M2794.0027)	<i>Spring 2017</i>
Teaching Assistant in Seoul National University	
Basic Calculus 1 (033.016)	<i>Spring 2015</i>
Undergraduate Student Instructor in Seoul National University	
Basic Calculus 2 (033.017)	<i>Fall 2014</i>
Undergraduate Student Instructor in Seoul National University	

REFERENCES

Frank C. Park (<i>fcp@snu.ac.kr</i>)
Professor, Mechanical Engineering, Seoul National University
Sang-Hoon Yeo (<i>s.yeo@bham.ac.uk</i>)
Lecturer, School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham

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