

# Sungjae Park

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## Education

Seoul National University:

Mar. 2017 – Aug. 2023

Department of Mechanical Engineering (Double Major in Mathematics), **Total GPA : 4.23/4.3**  
Graduated **1<sup>st</sup> place** in Mechanical Engineering Department, **2<sup>nd</sup> place** in Engineering Department  
among fall graduates.

## Research Interests

My research goal is to develop robot with human-like abilities, including **physical capabilities** for manipulation tasks, and **cognitive capabilities** for intuitive understanding of the real world. Specifically, I am interested in :

- Complex, long horizon manipulation tasks (e.g. cooking)
- Physical reasoning with interaction (e.g. inferring object properties with interaction)
- Physical reasoning for interaction (e.g. intuitive physics)

## Research Experience

**Cognitive Learning for Vision and Robotics Lab**, Research Intern

Jul. 2022 – Present

Advisor : **Joseph J. Lim**

**Done is Better than Perfect : Learning Complex Manipulation with Error Recovery** (In-progress)

- Developing a robot learning algorithm that can iteratively recover from failure states and retry, as humans naturally do when performing complex manipulation tasks.
- Modeled iterative recovery and retry process as hierarchical reinforcement learning, where the high level policy determines whether to use task policy or call recovery.

**Accelerating Reinforcement Learning with Critical States from Prior Data** (In-progress)

- Developing an efficient reinforcement learning algorithm based on task-oriented critical states.
- Critical states refer to states where number of near-optimal actions is significantly smaller than others, such as when the ball is about to reach the floor in Breakout.

**SNU Robotics Lab**, Undergraduate Thesis Research Intern

Mar. 2022 – Dec. 2022

Advisor : **Frank C. Park, Joseph J. Lim**

**Efficient Cross-Embodiment Learning with Object-Centric Planner**

- Developed cross-embodiment learning algorithm with object-centric motion planning.
- With an object-centric planner learned from offline demonstration data of another robot, the target robot can efficiently learn the same task.
- Awarded Outstanding BS Thesis Presentation Award

**Dynamic Robotics Systems Lab**, Research Intern

Jul. 2021 – Aug. 2021, Jan. 2022 – June. 2022

Advisor : **Jaheung Park**

**Vision Guided Peg Insertion**

- Developed vision-based peg-in-hole algorithm for dual robot arm with hole detection using hand-eye camera and YOLO.

### **Motion Planning under Constraint with Learned Reachable Manifold**

- Developed motion planning algorithm under constraint with block neural autoregressive flow (BNAF) for Panda Franka robot arm. Density estimation model was used to determine the discontinuity of the manifold.

## **Scholarships**

<b>Presidential Science Scholarship</b>	Mar. 2021 – Feb. 2023
<b>Gangwon Future Highflier Scholarship</b>	Jan. 2018 – Present
<b>Full-funded scholarship for academic excellence</b>	Mar. 2018 – Feb. 2019, Mar. 2021

## **Awards and Honors**

<b>Outstanding BS Thesis Presentation Award</b>	Dec. 2022
<b>2<sup>nd</sup> place, International Design Contest Robocon 2018</b>	Aug. 2018
<b>Silver Prize in Math/Computation Field, Samsung Humantech Paper Award</b>	Feb. 2015

## **Services**

**Reviewer** | NeurIPS 2023, ICLR 2024

## **Teaching Experience**

<b>Teaching Assistant</b>   Introduction to Robotics	Mar. 2022 – Jun. 2022
<b>Undergraduate Tutoring</b>   Linear Algebra 1	Mar. 2021 – Jun. 2021
<b>Undergraduate Tutoring</b>   Physics 1,2	Mar. 2018 – Dec. 2018, Mar. 2021 – Dec. 2021

## **Skills**

**Language** : C++, Python, Java

**Libraries/Frameworks** : Pytorch, ROS, YOLO, SMACH

**Modeling** : SolidWorks

## **English Proficiency**

**GRE** : Verbal Reasoning 160/170, Quantitative Reasoning 170/170, Analytical Writing 4.0/6.0

**TOEFL** : 112/120 ( Reading 29/30, Listening 30/30, Speaking 26/30, Writing 27/30 )