

# Seunghwan Um

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## RESEARCH STATEMENT

Hi there! I'm a PhD student at Robotics Innovatory, Sungkyunkwan University, South Korea, under the supervision of Prof.Hyouk Ryeol Choi. My research focuses on designing versatile robotic gripper in logistics. These days, I'm interested in developing a robotic system that can interact with the external environment for grasping or manipulation, so I'm considering various methods such as gripper design and imitation learning.

## EDUCATION

- **Sungkyunkwan University (SKKU)** Mar. 2022 - Present  
Suwon, Republic of Korea  
*Ph.D in Mechanical Engineering*
  - GPA: 4.19/4.50
- **Hanyang University (ERICA)** Mar. 2018 - Feb. 2022  
Ansan, Republic of Korea  
*B.S in Mechanical Engineering*
  - Grade: 3.90/4.50

## PUBLICATIONS

J=JOURNAL, C=CONFERENCE, S=IN SUBMISSION, P=PATENT, T=THESIS

- [J.2] **Development of Adaptive Gripper Enhancing Power Grasp Range and Linearity.**  
Issac Rhee, Chun Soo Kim, Heeyeon Jeong, Seunghwan Um, and Hyouk Ryeol Choi\* et al.  
*IEEE Access*, 2024.
- [J.1] **ReC-Gripper: A Reconfigurable Combined Suction and Fingered Gripper for Various Logistics Picking and Stowing Tasks.**  
Seunghwan Um, Heeyeon Jeong, Chun Soo Kim, Issac Rhee, and Hyouk Ryeol Choi\*.  
*IEEE Robotics and Automation Letters (RA-L), Presented in ICRA 2024*.
- [C.1] **Overcoming Heavy Clutter: Utilizing the Hybrid Grasping Network and Gripper.**  
Seunghwan Um, Yeong Gwang Son, Tat Hieu Bui, Ho Sang Jung, and Hyouk Ryeol Choi\*.  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024*  
*Workshop: Benchmarking via Competitions in Robotic Grasping and Manipulation*  [Best Extended Abstract]
- [S.2] **Title: T.B.D.**  
Seunghwan Um, Yeong Gwang Son, and Hyouk Ryeol Choi\*.  
The manuscript was invited to be published in *IEEE Robotics and Automation Practice (RA-P)*.
- [S.1] **Title: T.B.A.**  
Seunghwan Um, Yeong Gwang Son, Juyong Hong, Chun Soo Kim, et al. and Hyouk Ryeol Choi\*.  
Manuscript submitted for publication in *IEEE/ASME Transactions on Mechatronics (TMECH)*.

## PATENTS

- [P.3] **Hybrid Gripper Capable of Bin Picking and Shelf Picking.**  
Seunghwan Um, Heeyeon Jeong, Chun Soo Kim, Issac Rhee, and Yoon Haeng Lee.  
Korean Intellectual Property Office, Patent No. 10-2023-0076248. Publication Date: 2024.12.23.
- [P.2] **Adaptive Gripper Capable of Parallel Motion.**  
Issac Rhee, Chun Soo Kim, Seunghwan Um, Heeyeon Jeong, and Yoon Haeng Lee.  
Korean Intellectual Property Office, Patent No. 10-2023-0077512. Registration Date: 2023.12.06.
- [P.1] **Suction Gripper Capable of Translational and Rotational Movements.**  
Chun Soo Kim, Issac Rhee, Seunghwan Um, Heeyeon Jeong, and Yoon Haeng Lee.  
Korean Intellectual Property Office, Patent No. 10-2023-0093340. Registration Date: 2023.10.18.

## EXPERIENCE

- **AIDIN ROBOTICS - Cobot Solution Team** May 2022 - Present  
Anyang-si, Gyeonggi-do, Republic of Korea  
*Researcher*
  - Designed grippers for shelf-picking solutions, contributing to efficient logistics automation.
- **Korea Institute of Industrial Technology (KITECH)** October 2021 - December 2021  
Ansan-si, Gyeonggi-do, Republic of Korea  
*Research Student*
  - Designed and developed control systems for a 2-DoF manipulator, enhancing its performance and accuracy.
- **Wall Climbing Car (WCC) [Undergraduate Project]** December 2020 - October 2021  
Ansan-si, Gyeonggi-do, Republic of Korea  
*Team Leader*
  - Designed a wall-climbing car's propeller frame and control system.

## PROJECTS

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- **Development of Smart Vision System and All-in-One Universal Gripper for Multi-Various Random Piece Picking** May 2022 - Present  
*Participating organizations: AIDIN ROBOTICS, SKKU, KITECH, CJ Logistics* Republic of Korea
  - **Research Objective:** Developing robotic picking system including a gripper and vision system for piece picking in a logistics environment.
  - Designing an integrated gripper capable of various grasping strategy for a shelf environment among logistics environments
  - Researching grasping strategy that can pick objects while avoiding external constraints in a shelf environment

## HONORS AND AWARDS

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- 🏅 **Samsung Humantech Paper Award** Feb. 2025  
*Samsung Electronics Co., Ltd.* [Samsung Humantech ]
- 🏆 **9<sup>th</sup> Robotic Grasping of Manipulation Competition - Picking in Clutter** May. 2024  
*IEEE, IEEE RAS* [RGMC 2024 ]
- 🏅 **KSME Student Creative Design Competition** Oct. 2021  
*The Korean Society of Mechanical Engineers (KSME)* [YouTube ]
- 🏆 **Creative and Intelligent Robot Contest** Sep. 2021  
*Daejeon Metropolitan City, Chungnam National University* [YouTube ]

## GRANT

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- **BK21 Research Encouragement Scholarship** Fall. 2024  

- **Brain Hanyang, Academic Excellence Scholarship** Spring. 2018