

Yoon Ji Won

Seoul, Korea | younjw813@korea.ac.kr | (+82)10-3322-7991

RESEARCH INTERESTS

- Dynamics-based design and control for robotic systems
- Optimization frameworks for energy-efficient motion and force control
- Mechanism design for enhanced workspace and compliant interaction

EDUCATION

Korea University, Seoul, Korea

Mar 2019 – Feb 2026

B.S. in Mechanical Engineering

(Expected)

- **GPA:** 3.94/4.5 (Overall), 4.03/4.5 (Major)
- **Relevant Coursework:** Robotics (A+), Mechatronics (A+), Dynamics (A+), Microprocessor Programming (A+), Kinematics (A+), Manufacturing Processes (A+), Computer-Aided Design (A+)
- **Honors:** Dean's List (4 semesters), Korea University Excellence Scholarship (2023-2025)

RESEARCH EXPERIENCE

Research Assistant

Jun 2024 – Aug 2025

Korea Institute of Science and Technology (KIST), Seoul

Robogram Lab | Advisor: Dr. Yong Seok Ihn

- **KAPEX(KIST Next-Generation Humanoid) - Arm Design**
 - Developed multi-metric optimization framework combining RBDL and MuJoCo to optimize shoulder joint angles, achieving **18.4% workspace expansion** while minimizing joint torques and energy consumption
First author on research accepted for oral presentation at IROS 2025
 - Designed and fabricated compact (45mm × 75mm) 2-DoF wrist module with 6mm ball screw mechanism, achieving high backdrivability for safe human-robot interaction
- **Self-Driving Laboratory - Bimanual Manipulation System**
 - Designed novel antiparallelogram linkage shoulder mechanism with optimized link lengths, expanding bimanual workspace by **4.3%** for confined space manipulation
 - Achieved low-inertia rolling contact motion through kinematic optimization
- **Microsurgical Robotic System - Real-Time Control**
 - Implemented C-based real-time multi-axis motor control using EtherCAT protocol(PDO)
 - Developed and validated synchronous control modes (PPM, CSV) on EPOS4 controllers

PUBLICATIONS

Optimization Framework of the Shoulder Base Frame Initial Angle for Enhanced Dynamic Performance in a Humanoid Robotic Arm

Jiwon Yoon*, Sujin Lee*, Yong Seok Ihn

International Conference on Intelligent Robots and Systems (IROS), China, October 2025

*Accepted for Oral Presentation (*Equal contribution)*

Optimization of Shoulder Joint Frame Angles for Torque and Energy Performance Improvement in 7-DOF Humanoid Arms

Jiwon Yoon, Yong Seok Ihn

Korea Robotics Society Annual Conference (KRoC), Korea, February 2025

Excellence Undergraduate Paper Award

SELECTED PROJECTS

Electric Motor Design and Fabrication

Apr 2025 – Jul 2025

Hyundai H-Mobility Advanced Motor Project

- Designed permanent magnet synchronous motor using ANSYS Maxwell FEM analysis
- Led complete fabrication process including stator winding and powertrain integration
- Validated motor performance achieving 92% efficiency at rated load

Solar-Tracking Smart Parasol

Jun 2023 – Sep 2023

Korea University Creative Design Contest

- Designed 2-DoF solar tracking system to maximize shade coverage area throughout the day
- Fabricated functional prototype using acquired machining skills(welding, grinding)
- **Awarded 3rd Place** among 12 competing teams

TECHNICAL SKILLS

Programming: C/C++, Python, MATLAB, ROS2

Software: SolidWorks, NX, Creo, MATLAB-Simulink, MuJoCo, Isaac, LaTeX

Hardware: Arduino, Jetson Nano, EtherCAT, 3D printing

Languages: Korean (native), English (fluent)

SELECTED HONORS & AWARDS

- 2025** Excellence Paper Award, Korea Robotics Society Annual Conference
- 2025** University President's Award, Korea University Creative Challenge Program
- 2024** Certificate of Commendation, Gyeonggi Provincial Council
- 2024** Excellence Project Award, HD Hyundai Xitesolution
- 2023** Korea University Student Excellence Scholarship (renewable)

LEADERSHIP & SERVICE

Military Service: Republic of Korea Air Force, 10th Fighter Wing
Air Defence Artillery; Honorably discharged

Jun 2021 – Mar 2023

KUECS President (Engineering Volunteer Club), Korea University

Mar 2023 – Jun 2025

Led 80+ member club in STEM education outreach to 200+ elementary students across Seoul

- Progressed from Member → Executive → President over 2 years
- Awards: Best Club Award (Dean of Students), Gyeonggi Provincial Council Commendation

KUBA (Korea University Buddy Assistant)

Mar 2022 – Dec 2022

International Student Festival Booth Leader (Indonesia); Outstanding Volunteer