

## EDUCATION

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### **Korea Advanced Institute of Science and Technology**

Ph.D. in Mechanical Engineering, GPA: 3.99/4.30, Advisor: Prof. Jung Kim

Daejeon, South Korea

Mar. 2021 –Feb.2026

- Thesis: “A Vision-Based Tactile Sensor with a Fingertip Form Factor for Shape Reconstruction and Force Estimation”

### **Korea Advanced Institute of Science and Technology**

M.S. in Mechanical Engineering, GPA: 3.90/4.30, Advisor: Prof. Jung Kim

Daejeon, South Korea

Mar. 2019 –Feb. 2021

- Thesis: “Design of a Compact Flat Fabric Pneumatic Artificial Muscle for Soft Wearable Robotic Devices”

### **Korea Advanced Institute of Science and Technology**

B.S. in Mechanical Engineering (Minor: Electrical Engineering), GPA: 3.74/4.30

Daejeon, South Korea

Mar. 2014 –Feb. 2019

## PROFESSIONAL EXPERIENCE

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### **Postdoctoral researcher**

Korea Advanced Institute of Science and Technology

InnoCORE PRISM-AI center & Biorobotics Lab, Advisor: Prof. Jung Kim

Daejeon, South Korea

Mar. 2026 –Current

- Topic: “Tactile Intelligence and Humanoid Tactile Robotic Fingertips for Dexterous Manipulation”

## RESEARCH INTEREST

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### **Vision-Based Tactile Sensors for Dexterous Manipulation**

Tactile image processing, shape reconstruction, force estimation, object localization, classification

### **Pneumatic Artificial Muscles (PAM) for Wearable Robotic Devices**

Pneumatic actuator design and fabrication, fabric-based actuator, bidirectional actuation, sensorization, pneumatic simulation and control

### **Human-Machine Interfaces**

Surface electromyography (sEMG), assistive wearable device

## TECHNICAL SKILLS

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**Deep learning and computer language:** Pytorch, Python, MATLAB, LaTeX

**3D modeling and simulation:** SolidWorks, ABAQUS

**Robot operation:** LabVIEW, ROS

**Hardware prototyping:** Pneumatic actuator design, Soft material manufacturing, 3D printing

**Biosignal processing:** Surface electromyography

# PUBLICATIONS

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## *JOURNAL ARTICLES*

### [J6] Field-Programmable Robotic Folding Sheet

Hyunkyu Park, Yongrok Jeong, **Woojong Kim**, Jungrak Choi, Junseong Ahn, Jun-Ho Jeong, Inkyu Park, and Jung Kim  
*Nature Communications* (2025)  
(\*\* Nature publisher highlights, Media highlights including CNN)

### [J5] Graph-Structured Super-Resolution for Geometry-Generalized Tomographic Tactile Sensing: Application to Humanoid Faces

Hyunkyu Park, **Woojong Kim**, Sangha Jeon, Youngjin Na, and Jung Kim  
*IEEE Transactions on Robotics* (2024)  
(\*\* T-RO editorial highlights) presented at *ICRA 2025*, Atlanta, USA

### [J4] Bidirectional Double-Spring Pneumatic Artificial Muscle with Inductive Self-Sensing

Yeonha Cho <sup>†</sup>, **Woojong Kim** <sup>†</sup>, Hyunkyu Park, Jung Kim, and Youngjin Na  
(<sup>†</sup> Equally contributed)  
*IEEE Robotics and Automation Letters*, 8.12 (2023)

### [J3] Marker-Embedded Tactile Image Generation via Generative Adversarial Networks

Won Dong Kim, Sanghoon Yang, **Woojong Kim**, Jeong-Jung Kim, and Jung Kim  
*IEEE Robotics and Automation Letters*, 8.8 (2023)  
presented at *ICRA 2024*, Yokohama, Japan

### [J2] UVtac: Switchable UV Marker-Based Tactile Sensing Finger for Effective Force Estimation and Object Localization

**Woojong Kim** <sup>†</sup>, Won Dong Kim <sup>†</sup>, Jeong-Jung Kim, Chang-Hyun Kim, and Jung Kim  
(<sup>†</sup> Equally contributed)  
*IEEE Robotics and Automation Letters*, 7.3 (2022)  
presented at *ICRA 2023*, London, UK

### [J1] Compact Flat Fabric Pneumatic Artificial Muscle (ffPAM) for Soft Wearable Robotic Devices

**Woojong Kim**, Hyunkyu Park, and Jung Kim  
*IEEE Robotics and Automation Letters*, 6.2 (2021)  
(\*\* Best Paper Award in service robotics at IEEE ICRA 2021) presented at *ICRA 2021*, Xi'an, China

## *CONFERENCE PAPERS*

### [C3] Robotic Skin with Sparsely Embedded Transducers for Contact Localization on Non-planar Surfaces

Minju Kim, Junhwi Cho, Sangha Jeon, Hyunki Park, **Woojong Kim**, and Jung Kim  
*2026 23th International Conference on Ubiquitous Robots (UR)*, Under review

### [C2] UVDtact: UV Marker-Embedded Fingertip-Like Vision-Based Tactile Sensor for Shape Reconstruction and Force Estimation

**Woojong Kim**, Won Dong Kim, Hyunkyu Park, Joonho Lee, Jeong-Jung Kim, and Jung Kim  
*2026 IEEE International Conference on Robotics and Automation (ICRA)*, **Accept**

### [C1] Vision-Based Aided-Grasping in Teleoperation with Multiple Unknown Objects

Yunjoo Kim, **Woojong Kim**, Seongwoong Hong, Seulki Kyeong, Jirou Feng, and Jung Kim  
*Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (HRI)* (2020)

## AWARDS, HONORS, AND FELLOWSHIPS

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- **PRISM-AI InnoCORE Fellowship** Mar. 2026 - Current  
from Korean Government
- **Invited Speaker at the KRoC Flagship Conferences** 2022  
The 17th Korea Robotics Society Annual Conference (KRoC 2022)  
*For the contents of the awarded paper at ICRA 2021*
- **Best Paper Award in Service Robotics (Winner) (ICRA 2021)** 2021  
2021 IEEE International Conference on Robotics and Automation (ICRA 2021)  
*For the paper entitled “Compact Flat Fabric Pneumatic Artificial Muscle (ffPAM) for Soft Wearable Robotic Devices”*
- **KAIST Support Scholarship** Mar. 2019 - Feb. 2025  
from KAIST
- **National Science and Engineering Undergraduate Scholarship** Mar. 2016 - Feb. 2019  
from Korean Government
- **Dean’s List** Fall 2017  
from KAIST College of Engineering
- **Outstanding Achievement Award** 2016, 2015  
from Department of Mechanical Engineering, KAIST

## PROJECTS

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### Development of drone perching mechanism

Person in charge Jan. 2023 –Dec. 2025

- **Project objective** : R&D on the implementation of perching mechanism based on compliant actuators to perform long-term operation of military drones.
- **Funding** : Defense Acquisition Program Administration.
- **Role & Contribution** : Person in charge. Involvement in designing a bistable pneumatic actuator for perching drones, developing a lightweight standalone pneumatic pressure generation & control module, and demonstrating autonomous landing and perching.

### Development of vision-based tactile sensors and tactile image generation

Project participant Jan. 2021 –Dec. 2023

- **Collaboration** : Korea Institute of Machinery & Materials (KIMM).
- **Project objective** : Collaborative research on the hardware development of vision-based tactile sensors and the data generation of tactile images.
- **Role & Contribution** : Project participant. Involvement in developing a vision-based tactile sensor capable of obtaining independent, switchable tactile images using UV markers, designing tactile signal processing algorithms, and demonstrating robotic tasks including contact force-tracking and object alignment. Contributed to conceptual discussions on tactile image generation strategies. Research paper publication ([J2], [J3]).

### Wearable soft robotic suit for elders

Project participant Mar. 2019 –Jun. 2021

- **Collaboration** : Korea Institute of Robotics & Technology Convergence (KIRO).
- **Project objective** : National R&D on the soft wearable soft robotic suit capable of monitoring and assisting the walking of elders.
- **Funding** : Institute for Information & communication Technology Planning & evaluation.

- **Role & Contribution** : Project participant. Involvement in development of wearable sensing suit and participating in discussions on enhancing capacitive strain sensor design.

## **Wearable foot drop assistance suit for drop foot patients**

Project participant

Mar. 2019 –Dec. 2019

- **Collaboration** : Seoul National University Hospital (Prof. Dong Yeon Lee), Korea Institute of Industrial Technology (KITECH).
- **Project objective** : National R&D on the pneumatic wearable robotic suit for assisting drop foot disorder.
- **Funding** : Ministry of Science and ICT.
- **Role & Contribution** : Project participant. Involvement in developing a pneumatic control module, participating in discussions on thermal management for the battery pack, and performing human subject experiments.

## **DOMESTIC PUBLICATIONS**

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### **[8] Development of Underactuated Finger Mechanism for Vision-Based Tactile Sensor**

Hyunjo Chung, **Woojong Kim**, Junhwi Cho, and Jung Kim  
*The 20th Korea Robotics Society Annual Conference (KRoC 2025), Korea Robotics Society, 2025*

### **[7] Development of a Fabric-Based Pneumatic Bistable Gripper for Drone Perching**

**Woojong Kim**, Ung Heo, Sangha Jeon, and Jung Kim  
*The 39th Institute of Control, Robotics and Systems Annual Conference (ICROS 2024), 2024*

### **[6] Development of Compact Variable-Stiffness Actuator using Magnet Repulsion**

Gunhee Park, Hyunkyung Park, **Woojong Kim**, and Jung Kim  
*The 39th Institute of Control, Robotics and Systems Annual Conference (ICROS 2024), 2024*

### **[5] Comparison of Normal Force Estimation Performance of the UV Marker-based Tactile Sensor According to Voronoi Area Data Utilization of Marker Images**

**Woojong Kim**, Won Dong Kim and Jung Kim  
*The 38th Institute of Control, Robotics and Systems Annual Conference (ICROS 2023), 2023*

### **[4] Position Control of the Sensorized Flat Fabric Pneumatic Artificial Muscle (ffPAM)**

**Woojong Kim**, and Jung Kim  
*The 16th Korea Robotics Society Annual Conference (KRoC 2021), Korea Robotics Society, 2021*

### **[3] Force Characterization and Dynamic Analysis of the Flat Fabric Pneumatic Artificial Muscle**

**Woojong Kim**, and Jung Kim  
*2021 Korea Society of Biomechanics Annual Conference, 2021*

### **[2] Development of Backpack Loading Estimation Model under Different Locomotion Conditions (Level, Stair, Inclined) using Surface Electromyography (sEMG) and Ground Reaction Force**

Seulki Kyeong, Junghoon Park, **Woojong Kim**, and Jung Kim  
*2017 Korea Institute of Military Science and Technology Annual Conference, 2017*

### **[1] Development of Backpack Loading Estimation Model using Surface Electromyography (sEMG) of Gastrocnemius During Walking and Running**

Junghoon Park, **Woojong Kim**, Youngha Shin, and Jung Kim  
*Korea Society for Precision Engineering 2017 Spring Conference, 2017*

## TEACHING EXPERIENCE

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### **Korea Advanced Institute of Science and Technology**

*Teaching Assistant*

Daejeon, South Korea

Mar. 2021 –Feb. 2025

- [ME488] Introduction to Biomedical Machine Technology, Spring 2021
- [ME203] Mechatronics System Design, Fall 2021, 2022, 2023
- [ME303] Mechanical Engineering Laboratory, Fall 2021 - Spring 2023
- [ME459] Introduction to Visual Intelligence, Spring 2022
- [ME400] Capstone Design, Spring 2024
- [ME106] Human and Machine, Fall 2024