Woojong Kim

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Education

Korea Advanced Institute of Science and Technology — Daejeon, South Korea
Ph.D. in Mechanical Engineering, GPA: 3.99/4.30, Advisor: Prof. Jung Kim — Mar. 2021 –Current

Korea Advanced Institute of Science and Technology — Daejeon, South Korea
M.S. in Mechanical Engineering, GPA: 3.90/4.30, Advisor: Prof. Jung Kim — 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 — Daejeon, South Korea
B.S. in Mechanical Engineering (Minor: Electrical Engineering), GPA: 3.74/4.30 — Mar. 2014 –Feb. 2019

Publications

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 †, **Woojong Kim** †, Hyunkyu Park, Jung Kim, and Youngjin Na
(† **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 †, Won Dong Kim †, Jeong-Jung Kim, Chang-Hyun Kim, and Jung Kim
(† **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

[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*), **Under review**

[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 and scholarships

- **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

Research interest

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

Skills

Software: MATLAB, LabVIEW, Python, Pytorch, SolidWorks, ABAQUS, Inkscape, Arduino, LaTeX

Soft actuator and sensor fabrication: Pneumatic actuator design, elastomer fabrication

Machine learning: Regression, classification

Biosignal processing: Surface electromyography

Research project

Fingertip-like vision-based tactile sensor for shape reconstruction and force estimation	2024 - 2025
Fabric-based pneumatic bistable gripper for drone perching	2023 - 2025
Bidirectional double-spring pneumatic artificial muscle with inductive self-sensing	2022 - 2023
UV marker-based tactile sensing finger for effective force estimation and object localization	2021 - 2022
Compact flat fabric pneumatic artificial muscle for wearable robotic devices	2019 - 2021
Backpack loading estimation using surface electromyography for assistive wearable devices	2016 - 2017

Domestic publications

[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, Hyunkyu 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**, Younghha Shin, and Jung Kim
Korea Society for Precision Engineering 2017 Spring Conference, 2017

Teaching experience

Korea Advanced Institute of Science and Technology Daejeon, South Korea
Teaching Assistant Mar. 2021 –Feb. 2025

- Introduction to Biomedical Machine Technology
- Mechatronics System Design
- Human and Machine
- Mechanical Engineering Laboratory
- Introduction to Visual Intelligence