Jaemin Eom – Curriculum Vitae

Biorobotics Laboratory / Soft Robotics Research Center
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Research Interests

- Robotic Grippers
- Robotic Hands
- Soft Robotics
- Under-actuated Systems
- Tendon-driven Actuators
- Manipulator Path Planning
- Simulation and Control

Experience

Mar. 2025 - **Incoming Postdoctoral Research Associate**
Soft Robotics Research Center (SRRC), Biorobotics Lab, Seoul National University, Korea
- Advisor: Prof. Kyu-Jin Cho

Education

Sep. 2017 - Feb. 2025 **Ph.D. in Mechanical Engineering** (GPA : 3.77/4.3)
Seoul National University, Seoul, Korea
- Dissertation: Multi-Object Grasping Using Finger-to-Palm Translation for Pick-and-Place Tasks
- Advisor: Prof. Kyu-Jin Cho
- **Outstanding Doctoral Dissertation Award**

Mar. 2013 - Aug. 2017 **Bachelor in Mechanical engineering** (GPA : 3.92/4.3)
Seoul National University, Seoul, Korea
- **Summa Cum Laude**

PUBLICATIONS

International Journal

1. **Jaemin Eom**, Sung Yol Yu, Woongbae Kim, Chunghoon Park, Kristine Yoonseo Lee, and Kyu-Jin Cho, "MOGrip: Gripper for multiobject grasping in pick-and-place tasks using translational movements of fingers," **Science Robotics (I.F. 26.1)**, vol. 9, eado3939, 2024. [Paper], [Video], [Project Page]
2. Yuna Yoo*, **Jaemin Eom***, MinJo Park, and Kyu-Jin Cho, "Compliant Suction Gripper with Seamless Deployment and Retraction for Robust Picking against Depth and Tilt Errors," **IEEE Robotics and Automation Letters (I.F. 4.6)**, vol.8, no.3, 2023. **(Co-first author)** [Paper], [Video], [Project Page]
3. Woongbae Kim, **Jaemin Eom**, and Kyu-Jin Cho, "A Dual-Origami Design that Enables the Quasisequential Deployment and Bending Motion of Soft Robots and Grippers," **Advanced Intelligent Systems (I.F. 6.8)**, vol. 4, no. 3, 2021. [Paper], [Video]

4. Jun-Young Lee, **Jaemin Eom**, Sung Yol Yu, and Kyu-Jin Cho, "Customization Methodology for Conformable Grasping Posture of Soft Grippers by Stiffness Patterning," **Frontiers in Robotics and AI**, vol. 7, 2020. [Paper]

Referred Conference Paper

5. Jun-Young Lee, **Jaemin Eom**, Woo-Young Choi and Kyu-Jin Cho, "Soft LEGO: Bottom-up Design Platform for Soft Robotics," **2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)**, 2018, pp. 7513-7520. [Paper], [Video]

Journals in Preparation

6. **Jaemin Eom,** and Kyu-Jin Cho, "Manipulator Path Planning for Multi-Object Grasping in a Declutter Problem," in preparation.
7. **Jaemin Eom,** JaeHyun Lee, and Kyu-Jin Cho, "Robotic Hand Design for Multi-Object Grasping of Column-Shaped Objects," in preparation.

Patents

8. Kyu-Jin Cho, **Jaemin Eom**, Yuna Yoo, MinJo Park, "Longitudinal Deployable Vacuum Suction Cup," **PCT/KR2023/019352** (Patent Application, filed on Nov. 28th, 2023).
9. Kyu-Jin Cho, Jun-Young Lee, **Jaemin Eom**, "Soft Block Unit Comprising Expanding Block and Bending Block," **JP Patent 6620257** issued Nov. 22th, 2019.
10. Kyu-Jin Cho, Jaemin Eom, Yuna Yoo, MinJo Park, "Longitudinal Deployable Vacuum Suction Cup," **KR Patent 10-2624036** issued Jan. 8th, 2024.
11. Kyu-Jin Cho, **Jaemin Eom**, Sung Yol Yu, Woongbae Kim, "Gripper for Gripping Multi-Object with an Internal Storage," **KR Patent 10-2497956** issued Feb. 6th, 2023.
12. Kyu-Jin Cho, Jun-Young Lee, **Jaemin Eom**, "Soft Block Unit Comprising Expanding Block and Bending Block," **KR Patent 101950654** issued Apr. 14th, 2019.

Dissertation

13. **Jaemin Eom**, "Multi-Object Grasping Using Finger-to-Palm Translation for Pick-and-Place Tasks," Seoul National University, Seoul, Korea. [pdf]

Research Experience

Sep. 2024 - Present
Manipulator path planning for multi-object grasping in declutter problem
- Efficiently solved the decluttering problem by grasping and transporting multiple objects at once.
- Proposed an algorithm to find the minimum path for decluttering all given objects.

Mar. 2024- Present
Robotic hand design for multi-object grasping
- Designed a robotic hand that sequentially grasps multiple objects, stores them in the palm, and transports them all at once.
- Analyzed finger links' length and joint stiffness for target motion through analytic model and simulation.
- Design the experiments and demonstrations.

Aug. 2019- Dec. 2024
Multi-object grasping using finger-to-palm translation for pick-and-place tasks
- Proposed finger-to-palm translation as a key manipulation skill for multi-object grasping in pick-and-place tasks.
- Presented a finger design enabling finger-to-palm translation.
- Introduced a soft conveyor palm design capable of storing multiple objects simultaneously.
- Designed the experiment, conducted experimental work, and performed demonstrations.
- Conducted analytic modeling and ABAQUS simulation.

Dec. 2020- Dec. 2022 **Compliant suction gripper with seamless deployment and retraction**
- Supervised a UROP student and submitted a paper to IEEE Robotics and Automation Letters.
- Designed a deployable body of a suction cup.
- Proposed a pneumatic circuit design for seamless deployment, picking, and retraction.
- Designed the experiments and demonstrations.

Jan. 2020 – Dec. 2022 **Development of a collaborative assistive robot arm utilizing foldable soft robot technology**
Funded by *Ministry of Trade, Industry & Energy*
- Integrated the developed foldable gripper and the developed robotic arm.

Nov. 2020- Dec. 2021 **Dual-Origami Design that Enables the Quasisequential Deployment and Bending Motion**
- Designed the experiments and demonstrations.

Jan. 2018 - Dec. 2020 **Development of modular gripper for small quantity production process**
Funded by *Korea Institute of Machinery & Materials*
- Principal investigator of research project.
- Controlled the developed soft gripper using ROS communication.
- Developed a customized soft gripper with task specific designs.

Sep. 2017 - May 2020 **Development of fundamental soft robotics technology for advanced soft grippers**
Funded by *Ministry of Trade, Industry & Energy*
- Principal investigator of research project.
- Developed pneumatically actuated soft gripper for various objects, especially e-commerce.
- Controlled the developed soft gripper using ROS communication.
- Benchmarked the Amazon Picking Challenge to analyze feasibility of gripper.

Jan. 2018 – Dec. 2019 **A hybrid gripper with pinching and suction grasp modes using a soft reconfigurable structure**
- Designed of a soft reconfigurable structure that functions as a gripper with fingers and transforms into a suction cup upon everting.
- Proposed a tendon routing for adaptive grasping.

Jan. 2017 – Dec. 2018 **Soft LEGO: Bottom-up design platform for soft robotics**
- Proposed modular soft pneumatic actuator design compatible with LEGO.
- Utilized the ABAQUS simulation to predict the behavior of a soft pneumatic module.
- Designed the demonstrations.

Honor and Awards

Feb. 2025 Outstanding Doctoral Dissertation Award (Department of Mechanical Engineering)
Apr. 2021 1st prize winner, RoboSoft 2021 Manipulation Challenge, IEEE International Conference on Soft Robotics
Nov. 2020 Silver Prize, 5th KSME-SEMES Open Innovation Challenge, Young Engineers Group
Dec. 2019 Silver Prize, 4th KSME-SEMES Open Innovation Challenge, Young Engineers Group
Apr. 2019 3rd prize winner, RoboSoft 2019 Manipulation Challenge, IEEE International Conference on Soft Robotics
Feb. 2019 Bronze Prize, 25th SAMSUNG Humantech Paper Award
Nov. 2023 Honorable Mention, 8th KSME-SEMES Open Innovation Challenge (Young Engineers Group)
Nov. 2023 Honorable Mention, 8th KSME-SEMES Open Innovation Challenge (Young Engineers Group)

Technical Skills

Design & Manufacturing, Simulation, Embedded system, Control

1. Various prototyping experiences (MOGrip, Robotic hand, Deployable suction gripper, Experimental setups)
2. Actuator system design and control (Tendon-driven systems for the under-actuated gripper, Pneumatic circuit design, Low-level control, Manipulator path planning)
3. Analysis and Simulation (ABAQUS, MATLAB)
4. CAD design (SOLIDWORKS)
5. Manufacturing (Elastomer molding for soft robot fabrication, Laser cutting, 3D printing, Heat press)
6. Circuit design (Eagle CAD)

Teaching Experience

Sep. 2019 - Dec. 2019	**Teaching Assistant** **Dynamics (M2794.001200)** Seoul National University *Supervisor : Prof. Kyu-Jin Cho*
Mar. 2018 - Jun. 2018	**Teaching Assistant** **Management in Mechanical Engineering 1 (M2794.004500)** Seoul National University *Supervisor : Prof. Young-sang Yoo*
Jan. 2025 - Present Feb. 2023 - Dec. 2024 Dec. 2020 - Dec. 2022 Sep. 2018 - Aug. 2019	**B.S Thesis/UROP Tutoring** Led the B.S. Thesis of **one** undergraduate student (Prof. Kyu-Jin Cho) Led **six** students for the Undergraduate Research Opportunities (Prof. Kyu-Jin Cho)