

Chaerim Moon

1428 Mechanical Engineering Laboratory, Urbana, IL 61801
🏠 chaerimmoon.github.io 📄 chaerim-moon ✉ cm74@illinois.edu

Research Area

Robotic Systems Architecture Design and Integration

- Holistic design of robotic embodiment, software stack, and human-robot interfaces
- Computational architecture design for motion planning in multi-limb robotic systems
- Real-time integration of perception, planning, and control modules

Representative research project domains include:

- 🟡 Human-in-the-loop multi-limb manipulation [🔍 project page](#)
- 🟢 Human-robot non-verbal communication [🔍 project page](#)
- 🟠 Mechanism design for wearable and industrial robots

Education

- University of Illinois Urbana-Champaign, Champaign, IL** (GPA: 4.0/4.0) Aug 2022 – Present
PhD candidate in Mechanical Science and Engineering
Dissertation (proposed): Constraint-Driven Motion Planning Architectures for Heterogeneous Robotic Systems
- Korea University, Seoul, Korea** (GPA: 4.0/4.0) Mar 2020 – Feb 2022
MS in Mechanical Engineering
Dissertation: A lower-back exoskeleton with a four-bar linkage structure for providing extensor moment and lumbar traction force
- Korea University, Seoul, Korea** (GPA: 4.0/4.0 (major), 3.92/4.0 (overall)) Mar 2016 – Feb 2020
BS in Mechanical Engineering; Graduated with Great Honor
Exchange program: Western University, ON, Canada (Fall 2018 – Spring 2019)

Publications

10. **Chaerim Moon** and Joohyung Kim, "Strategies for Moment Compensation in Supernumerary Robotic Limbs Manipulation Tasks", *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2024. [[📄 paper](#)] [[🎥 video](#)]
🟡 *Keywords: human-in-the-loop manipulation, physical HRI, multi-limb coordination*
9. **Chaerim Moon** and Joohyung Kim, "Assessing the Physical Impact of Supernumerary Limbs on a Human Subject: A Simulation Study", *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2024. [[📄 paper](#)]
🟡 *Keywords: human-in-the-loop manipulation, physical HRI, dynamic analysis*
8. **Chaerim Moon** and Joohyung Kim, "Coordinated Motion Planning of a Wearable Multi-Limb System for Enhanced Human-Robot Interaction", *Workshop on Multilimb Coordination in Human Neuroscience and Robotics: Classical and Learning Perspectives at IROS*, 2023. [[📄 paper](#)]
🟡 *Keywords: human-in-the-loop manipulation, physical HRI, multi-limb coordination*
7. **Chaerim Moon**[†], Sean Taylor[†], Kevin Gim, Sankalp Yamsani, Kazuki Shin, Kyungseo Park, and Joohyung Kim, "Robotic Backpack System with Pluggable Supernumerary Limbs", *Demo Session, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023. [[📄 paper](#)] [[🎥 video](#)]
🟡 *Keywords: human-in-the-loop manipulation, teleoperation, human pose estimation*
6. **Chaerim Moon**, Sankalp Yamsani, and Joohyung Kim, "Development of a 3-DOF Interactive Modular Robot with Human-like Head Motions", *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2023. [[📄 paper](#)] [[🎥 video](#)]
🟢 *Keywords: human-robot non-verbal communication, human subject tracking, robotic head module*
5. **Chaerim Moon**, Jangho Bae, Jaewon Kwak, and Daehie Hong, "A lower-back exoskeleton with a four-bar linkage structure for providing extensor moment and lumbar traction force", *IEEE Transactions on Neural Systems*

and Rehabilitation Engineering (TNSRE), 2022. [[📄 paper](#)]

■ Keywords: wearable robot mechanism design, linkage synthesis, exoskeleton

4. **Chaerim Moon** and Daehie Hong, "Calculation of reduced back moments with a back support exoskeleton", *International Symposium on Precision Engineering and Sustainable Manufacturing*, 2021.
■ Keywords: wearable robot mechanism design, linkage synthesis, exoskeleton
3. **Chaerim Moon**, Oh Young Kwon, Jaemyung Huh, and Daehie Hong, "Design of a double-scissor lift for heavy-duty automated guided vehicles", *KSPE 2021 Spring Conference*, 2021.
■ Keywords: industrial robot mechanism design, dynamic analysis
2. **Chaerim Moon** and Daehie Hong, "Biomechanical design and control of supernumerary robotic arms for enhancing the ladder work safety", *International Symposium on Precision Engineering and Sustainable Manufacturing*, 2020.
■ Keywords: wearable robotic system design, workspace analysis, biomechanics
1. **Chaerim Moon** and Daehie Hong, "Biomechanical design criteria of extra robotic upper limbs for construction workers", *KSPE 2020 Conference*, 2020.
■ Keywords: wearable robotic system design, workspace analysis, biomechanics

Teaching Experiences

Graduate Teaching Assistant, UIUC

Dynamics (TAM 212)	Fall 2025 – Spring 2026
Introduction to Humanoid Robotics (ECE 598 JK)	Spring 2025
Robotics Project (ECE 398 JK)	Fall 2024

Graduate Teaching Assistant, Korea University

AI Seminar Series for Future Industries	Fall 2021
Dynamics	Spring 2020 – Spring 2021

Professional Services

Reviewer

IEEE International Conference on Robotics and Automation (ICRA)
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
IEEE-RAS International Conference on Humanoid Robots (Humanoids)

Workshop Organizer

3rd Unconventional Robots: From Concept to Real-World Systems, *ICRA 2026*

Honors

Kwanjeong Overseas Fellowship , <i>Kwanjeong Educational Foundation</i> <i>Selected as the representative scholarship recipient</i>	Fall 2022
---	-----------

Korea Technocomplex Scholarship , <i>Korea Technocomplex</i> <i>Awarded to top-ranked incoming graduate students</i>	Spring 2020 – Fall 2020
--	-------------------------

National Science and Engineering Scholarship , <i>The Government of Korea</i> <i>Awarded to selected STEM students nationwide; full tuition coverage</i>	Spring 2018 – Fall 2019
--	-------------------------

Hyunsong Scholarship , <i>Hyunsong Educational and Cultural Foundation</i> <i>Awarded upon department nomination for academic excellence</i>	Spring 2017 – Fall 2019
--	-------------------------

Skills

Programming Languages: C++, Python, MATLAB

Software Tools: ROS, MuJoCo, OpenCV, OpenSim, SolidWorks