Chaerim "Wendy" Moon

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

Research Area

Physics-Aware Robotic Systems Architecture Design and Integration
– Holistic design of robotic embodiments, robot software pipelines, 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:
Generalizable grasp-based locomotion planning for multi-limb robots
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

Publications

11. **Chaerim Moon**, Joohyung Kim, and Justin Yim, "Motion Design for Grasp-Based Dynamic Locomotion of Multi-Limbed Robots in Microgravity", *In Preparation*
keywords: legged locomotion, whole-body dynamics, multi-limb coordination
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, linkage 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*

Scholarships

Kwanjeong Overseas Fellowship, *Kwanjeong Educational Foundation* — Fall 2022 – Present
Selected as the representative scholarship recipient

Korea Technocomplex Scholarship, *Korea Technocomplex* — Spring 2020 – Fall 2020
Awarded to top-ranked incoming graduate students

National Science and Engineering Scholarship, *The Government of Korea* — Spring 2018 – Fall 2019
Awarded to selected STEM students nationwide; full tuition coverage

Hyunsong Scholarship, *Hyunsong Educational and Cultural Foundation* — Spring 2017 – Fall 2019
Awarded upon department nomination for academic excellence

Skills

Programming Languages: C++, Python, MATLAB
Software Tools: ROS, MuJoCo, OpenCV, OpenSim, SolidWorks