

Chaerim Moon

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Research Area

Computational Architecture Design for Multi-Limb and Multi-Segment Robotic Systems

- Hierarchical and modular framework design for coordinated whole-body motion planning
- Real-time integration of perception, planning, and control modules
- Holistic design of robotic embodiment, motion planning architectures, and human-robot interfaces

Experienced in building robotic platforms for interactive head gesture motion; human-in-the-loop teleoperation and vision-based manipulation; unconventional legged and non-legged locomotion

Education

University of Illinois Urbana-Champaign, Champaign, IL (GPA: 4.0/4.0) Aug 2022 – Present
PhD candidate in Mechanical Science and Engineering
Dissertation (tentative): 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

- [1] **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] *Topic: human-in-the-loop manipulation*
- [2] **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] *Topic: human-in-the-loop manipulation*
- [3] **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] *Topic: human-in-the-loop manipulation*
- [4] **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] *Topic: human-in-the-loop manipulation*
- [5] **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] *Topic: interactive head gesture motion*
- [6] **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*, 2022. [paper] *Topic: kinematic synthesis, biomechanical analysis*
- [7] **Chaerim Moon** and Daehie Hong, "Calculation of reduced back moments with a back support exoskeleton", *International Symposium on Precision Engineering and Sustainable Manufacturing*, 2021. *Topic: biomechanical analysis*
- [8] **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. *Topic: mechanism design*

- [9] **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. *Topic: biomechanical analysis*
- [10] **Chaerim Moon** and Daehie Hong, "Biomechanical design criteria of extra robotic upper limbs for construction workers", *KSPE 2020 Conference*, 2020. *Topic: biomechanical analysis*

Honors

Scholarships and Fellowships

Korea Technocomplex Scholarship, <i>Korea Technocomplex</i>	2020 – 2020
National Science and Engineering Scholarship, <i>The Government of Korea</i>	2018 – 2019
Hyunsong Scholarship, <i>Hyunsong Educational and Cultural Foundation</i>	2017 – 2019

Travel Grants

Relocation allowance for selected graduate students, <i>UIUC MechSE</i>	2022
Annual conference for Personal Urban Mobility Access (PUMA), <i>Korea University</i>	2017 & 2018

Honors

Great Honor, <i>Korea University</i>	2020 Winter Graduation
Semester High Honors, <i>Korea University</i>	Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2019
Dean's List, <i>Western University</i>	2018 – 2019

Teaching Experiences

Graduate Teaching Assistant, *UIUC*

Dynamics (TAM 212)	Fall 2025
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, Fall 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)

Skills

Languages: C++, Python, MATLAB

Tools: ROS, MuJoCo, OpenSim, SolidWorks