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 student 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)

Honors

Scholarships and Fellowships

Kwanjeong Overseas Fellowship, *Kwanjeong Educational Foundation*	2022 – Present
Korea Technocomplex Scholarship, *Korea Technocomplex*	2020 – 2020
National Science and Engineering Scholarship, *The Government of Korea*	2018 – 2019
Hyunsong Scholarship, *Hyunsong Educational and Cultural Foundation*	2017 – 2019

Travel Grants

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

Honors

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

Publications

[1] **Chaerim Moon** and Joohyung Kim, "A Motion Planning Framework for SRL-Assisted Locomotion in Complex Microgravity Environments", *Under Review* *Topic: unconventional legged locomotion*

[2] **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*

[3] **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*

[4] **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*

[5] **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*

[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] *Topic: interactive head gesture motion*

[7] **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*

[8] **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*

[9] **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*

[10] **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*

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

Teaching Experiences

Graduate Teaching Assistant, *UIUC*

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