Chaerim Moon

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Research Area

Computational Architecture Design for Multi-Limb 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

Education

University of Illinois Urbana-Champaign, *Champaign, IL* (GPA: 4.0/4.0) — Aug 2022 – Present
PhD candidate in Mechanical Science and Engineering
Advisors: Prof. Joohyung Kim and Prof. Justin Yim

Korea University, *Seoul, Korea* (GPA: 4.0/4.0) — Mar 2020 – Feb 2022
MS in Mechanical Engineering
Advisor: Prof. Daehie Hong
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, "Strategies for Moment Compensation in Supernumerary Robotic Limbs Manipulation Tasks", *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2024. [paper][video]

[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]

[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.

[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. [video]

[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]

[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]

[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.

[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.

[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.

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

Research Positions

Kinetic Intelligent Machine Lab (KIMLAB), *UIUC*
Graduate Research Assistant — July 2022 – Present

Mechatronics and Field Robotics Lab (MFR), *Korea University*
Researcher — Mar 2022 – June 2022
Graduate Research Assistant — Mar 2020 – Feb 2022
Undergraduate Research Assistant — Dec 2017 – June 2018, July 2019 – Feb 2020

Teaching Positions

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

References

Prof. Joohyung Kim
Associate Professor at Department of Electrical and Computer Engineering,
University of Illinois Urbana-Champaign
Contact: joohyung@illinois.edu

Prof. Justin Yim
Assistant Professor at Department of Mechanical Science and Engineering,
University of Illinois Urbana-Champaign
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Prof. Daehie Hong
Professor at Department of Mechanical Engineering,
Korea University
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