

# Chaerim Moon

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## Research Area

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### Physical Human-Robot Interaction (pHRI)

- Model-based motion planning with human-in-the-loop
- Robotic system design for physical and social HRI
- Biomechanical analysis of wearable robots

## Education

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- 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

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### 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

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- [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.
- [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

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### **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

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### **Robotics Project, UIUC**

Graduate Teaching Assistant

Fall 2024

### **AI Seminar Series for Future Industries, Korea University**

Graduate Teaching Assistant

Fall 2021

### **Dynamics, Korea University**

Graduate Teaching Assistant

Spring 2020, Fall 2020,

Spring 2021

## Professional Services

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### **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

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**Languages:** C++, Python, MATLAB

**Tools:** ROS, MuJoCo, OpenSim, SolidWorks

## References

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**Prof. Joohyung Kim**

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University of Illinois Urbana-Champaign  
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**Prof. Justin Yim**

Assistant Professor at Department of Mechanical Science and Engineering,  
University of Illinois Urbana-Champaign  
Contact: jkyim@illinois.edu

**Prof. Daehie Hong**

Professor at Department of Mechanical Engineering,  
Korea University  
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