# Hanbin **Jang**

· Robotics/Control/Planning/Learning

*Seoul National University, Seoul, South Korea*

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## Education

**Seoul National University (SNU)** — *Seoul, South Korea*

B.S. in Mechanical Engineering, Minor in Electrical & Computer Engineering — *Mar. 2019 - Feb. 2026*

**North Carolina State University (NCSU)** — *Raleigh, NC, US*

Exchange student in the Department of Mechanical and Aerospace Engineering — *Jan. 2025 - Aug. 2025*

## Research Interests

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|---|---|
| **Planning & Control** | Whole-body Planning/Control, Hierarchical Architecture, Hybrid Control Methods (model-based + data-driven) |
| **AI & ML** | Deep Learning, Data-driven System Identification, Reinforcement Learning, Sim-to-Real Transfer |
| **Systems** | Legged Robots, Wearable Robots, Autonomous Systems, Nonlinear Systems |
| **Hardware** | Quadrupeds, Robotic End-effectors, Wearable Robots |

## Research Experience

**Hybrid Intelligent Experimental Robotics (HIER) Lab at NCSU** — *Raleigh, NC, USA*

Instructed by Dr. Jaemin Lee

Undergraduate Research Assistant — *Jan. 2025 - Aug. 2025*

- Implemented data-driven learning pipeline for adaptive quadrupedal locomotion over challenging terrains
- Designed hybrid control architecture by blending model-based control and data-driven learning
- Developed API for data acquisition from Mujoco and for deep neural network training (C++/Python)

**Wearable Robotics Lab (WRL) at SNU** — *Seoul, South Korea*

Instructed by Assistant Prof. Jinsoo Kim

Undergraduate Research Assistant — *Jul. 2024 - Dec. 2024*

- Designed hardware parts of a soft hip-flexion exo-suit to mitigate the freezing symptoms of Parkinson's disease patients.
- Designed CAD models for motor casing and tendon–pulley system, and fabricated coupling parts between load-cell and fabric components.
- Developed adjustable textile components for human wearability, ensuring applicability across diverse body sizes and conditions.

**Soft Robotics and Bionics Lab (SRBL) at SNU** — *Seoul, South Korea*

Instructed by Prof. Yonglae Park

Undergraduate Research Assistant — *Jun. 2023 - Jan. 2024*

- Designed a soft end-effector for fabric gripping using an air-suction mechanism

## Skills

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|---|---|
| **Prototyping** | CAD (Solidworks, Fusion360), 3D Printing (FDM, SLA, SLS), Textile Fabrication |
| **Programming** | Python, MATLAB, C++ |
| **Simulation & Control** | Mujoco, OSQP |
| **Image Editing** | Adobe Photoshop, Lightroom (technical illustration, experiment documentation) |
| **Languages** | Korean (Native), English (Fluent) |
| **Others** | Linux OS (Ubuntu), Windows OS |

## Honors & Awards

12/20/24 **3rd Prize at Mechatronics Contest**, Seoul National University — *Seoul, South Korea*

12/06/24 **Outstanding B.S. Thesis Presentation Award**, Seoul National University — *Seoul, South Korea*

# Publications

**Data-driven Whole-Body Locomotion Control: Adaptive Quadrupedal Locomotion over Multiple Terrains** — *IEEE Robotics and Automation Letters*

1st Author — *Now*

- Proposed hybrid approaches that combine model-based and data-driven methods to implement adaptive locomotion control under varying friction conditions (in preparation)

# Projects & Activities

**Summer Symposium by Office of Undergraduate Research at NCSU** — *Raleigh, NC*

Presenter for <Reactive Locomotion of Quadruped Robots over Various Terrains: Data-driven Learning for Model-based Planning and Control> — *Jul. 2025*

- Proposed a novel control architecture combining model-based and data-driven approaches

**B.S. Graduation Thesis Poster Presentation Contest at SNU** — *Seoul, South Korea*

Presenter for <A study on how stroke plane angle difference affects the hovering of damselfly> — *Dec. 2024*

- Analyzed the vorticity induced by the difference between fore-wing and hind-wing pairs of damselflies using CFD
- Specified that the re-attachment location of Leading Edge Vortex is important in determining aerodynamical performance

**Mechatronics Contest** — *Seoul, South Korea*

State Estimation Algorithm Design, Communication system construction — *Dec. 2024*

- Designed a ball tracking system using vision and 3D location estimator
- Proposed the concept of an automated referee system for commercial purpose

**Design a Zero-Velocity-Update point prediction model** — *Seoul, South Korea*

Data collection setup & Data processing algorithm design — *Dec. 2024*

- Trained a Deep learning model to predict ZUPT point for wearable robots using IMU signals

**Training Program for Future Automobile Designers** — *Si-heung, South Korea*

Scholarship student — *Dec. 2023 - Jan. 2024*

- Being trained on the latest technologies
- Designed a mini size autonomous car system

**Design of a malfunction detector for rotational machine** — *Seoul, South Korea*

Feature selection method design — *Dec. 2023*

- Designed a detection algorithm to recognize the malfunction of machines with rotating parts using conventional machine learning methods

**ROBOCON 2019** — *Seoul, South Korea*

Hardware/End-effector design — *Dec. 2019*

- Designed a wheeled robot that picks up, stores, and unloads items

# Services & Volunteers

**Fabrication Equipment Manager & Instructor** — *Seoul, South Korea*

Student Employee at Park's Creative Space, the Department of Mechanical Engineering, SNU — *Feb. 2023 - Dec. 2024*

- Managed shared FDM/SLA/SLS 3D printers for prototyping and instructed beginners how to use the equipments

**Volunteer for Angel's Nest Shelter** — *Goyang, South Korea*

Student Volunteer of '*Kkori (Tail)*' (Campus Animal Welfare Volunteer Club), SNU — *2022 - 2024*

- Provided care and support for rescued dogs and cats, including feeding, cleaning, and enrichment activities
- Served as team leader for designing and producing fundraising items (postcards and eco-bags) and donated all proceeds to animal welfare initiatives

**Republic of Korea Army** — *South Korea*

Mandatory Military Service — *Sep. 2020 - Mar. 2022*

- Served full term of mandatory military service and discharged as Sergeant

**Volunteer for Group Project Instructor** — *Daegu, South Korea*

Student Mentor of *P.I. (Progress for Ideal)*, Maecheon High School — *2019 - 2023*

- Organized and managed interdisciplinary research-like summer camp '*Consilience*'

**Volunteer for Dream Camp Mentor** — *Gwangju, South Korea*

One-off Student Volunteer — *Aug. 2020*

- Guidance in college admissions and career path exploration

## Scholarships

**Cohort 2 Scholar, Korea-U.S. Special Exchange Program for STEM Students** *Seoul, South Korea*

Korea Institute for Advancements of Technology (KIAT) *Nov. 2024*

- Awarded the Youth STEM Scholarships for robotics field