

Dexterous Manipulation for Humanoids in Industrial Tasks

Sim-to-Real Learning with Vision-Language-Action Policies
on the Kawada NEXTAGE humanoid platform

The Vision

Humanoid robots have yet to leave the laboratory. This project aims to change that: we are developing dexterous, general-purpose manipulation capabilities that allow humanoids to operate in **real human working environments** and perform industrial tasks reliably.

To this end we pursue an ambitious, full-stack approach that combines **robotics science**, **machine learning**, **GPU-accelerated simulation**, **sim-to-real transfer**, and **Vision-Language-Action (VLA) models**.

The project is carried out jointly with **Kawada Robotics** (Japan), **Keio University** (Japan) and the **University of Wollongong** (Australia), around Kawada's [NEXTAGE](#) humanoid.



Fig. 1: Humanoid model to be used in the project

Who we are looking for: senior-year undergraduates in **Computer Science**, **Electrical-Electronics Engineering**, **Mechanical Engineering** and **Industrial Engineering**. The work can be taken as your **senior project**, with a possible extension to a **Master's thesis**.

What You Get

- Participate in an **international moonshot project**
- Access to robotics infrastructure at the **Biomechatronics Lab**: GPUs, state-of-the-art simulators and real robots
- Tackle a **real-world problem** with industrial relevance
- Grow your professional network organically
- Attend flagship conferences (**CoRL**, **ICRA**, **IROS**) if positive results are obtained
- Become a member of the Biomechatronics Lab and work alongside **PhD-level experts**

What We Expect

- Proficiency in **Python**
- Working environment: **Linux (Ubuntu)**
- Strong math foundation: **calculus**, **linear algebra**, **differential equations**
- Preliminary knowledge of **machine learning** (reinforcement learning)
- Good command of English (written and oral)
- Curiosity-driven mindset
- Self-motivation, with regular, dedicated lab time

Eligibility

Senior-year students may apply, and they must adopt this work as their senior project. Students planning a Master's application starting next semester are also eligible (they may apply through their own department).

How to Apply

To apply, send your **CV**, **transcript** and a **1-page motivation letter** (all in PDF) to

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