

# ALFRED CUEVA

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## Research Interests

Optimal Control, Supervised Learning, Reinforcement Learning, Decision Making Under Uncertainties.

## Education

### Seoul National University

Mar. 2020 – Feb. 2024

BS in Mechanical Engineering (Robotics Concentration), **Total GPA: 9.12/10.0**

Seoul, South Korea

- Coursework: Reinforcement Learning (Graduate), Humanoid Robot Bipedal Walking and Control (Graduate), Sensor-Based Spatial Intelligence (Graduate), Deep Learning (Graduate), Mechanical System Modeling and Control

## Professional Experience

### Samsung C&T

Mar. 2024 – Present

Robotics Engineer

Seoul, South Korea

- Developed obstacle detection system using YOLOv5 for collaborative robots with 92% accuracy
- Engineered control software using Disturbance Observer, reducing steady-state error by 15% and enhancing precision of a 7-DOF manipulator.
- Implemented RRT-based motion planning for drill manipulator arms operating on cluttered environments.
- Designed human-machine interface for robotic operation, integrating ROS with visualization tools (Rviz and Gazebo).
- Implemented Hybrid A\* for motion planning in collaborative robots, building testing environments and ROS pipelines for integration and validation.

### Samsung C&T

Jul. 2023 – Aug. 2023

Engineering Intern

Seoul, South Korea

- Engineered a deep learning algorithm for detecting heat anomalies in semiconductor sites, improving positional accuracy and heat map estimation efficiency by 40%.

## Research Experience

### Dynamic Robotics Systems Lab

Sep. 2023 – Feb. 2024

Undergraduate Thesis Research Intern - PI: Prof. Jaeheung Park

Seoul, South Korea

- Developed a Deep Reinforcement Learning framework to find optimal actuator designs for legged robots with weak actuation using PPO, Potential Based Rewards and Bayesian Optimization.
- Achieved a 19% improvement of the maximum forward velocity under curriculum learning and increased velocity tracking accuracy. Reduced cost of transportation by 22% while ensuring a symmetric gait for added mass scenarios.
- Awarded **Outstanding BS Thesis Presentation Award**

### Dynamic Robotics Systems Lab

Dec. 2022 - Jul. 2023

Research Intern - PI: Prof. Jaeheung Park

Seoul, South Korea

- Designed novel reward functions for model-free reinforcement learning algorithms (PPO) and evaluated their impact on bipedal locomotion tasks, leading to significant performance enhancements in IsaacGym simulator trials.
- Optimized learning pipeline with parallel environments and hyper-parameter tuning, reducing convergence time.

### Soft Robotics & Bionics Lab

Dec. 2021 – Mar. 2022

Research Intern - PI: Prof. Yong-Lae Park

Seoul, South Korea

- Designed a Capacitive Touch Sensing Grid as a force control interface for an Industrial Sewing Robot. Modeled force dynamics using Arduino and CoppeliaSim, improved sewing speed by 20%

## Scholarships

**Global Korea Scholarship.** National winner, full funding for undergraduate studies

Mar. 2019 – Mar. 2024

Ministry of Education, Republic of Korea

**COAR Scholarship.** Full ride for IB Diploma Programme (0.2% admission rate)

Mar. 2016 – Feb. 2019

Ministry of Education, Peruvian Government

## Awards & Honors

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<b>Smart Construction Robotics Challenge:</b> 10k USD for novel drilling robot for semiconductor sites	<b>Sep. 2024</b>
<i>Ministry of Land, Infrastructure and Transport, Republic of Korea</i>	
<b>Outstanding BS Thesis Presentation Award</b> (1 out of 120 graduates)	<b>Dec. 2023</b>
<b>Samsung C&amp;T Global Intern</b> (1 of 40 recipients nationwide)	<b>Jul. 2023</b>
<b>Student Researcher Fellowship:</b> 1k USD funding for undergraduate research	<b>Jan. 2023</b>
<b>Certificate of Appreciation (AI Tech Play):</b> Conferred by the Dean of College of Engineering	<b>Jul. 2021</b>

## Extracurricular Activities

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<b>Peruvian-Korean Academic Association (ASAPEC)</b>	<b>Mar. 2023 – Dec. 2023</b>
<i>Founding Member</i>	<i>Student Association</i>

- Led a team of 20 members to organize fraternity meetings and informative sessions for prospective students in STEM fields and higher education in Korea, attended by 100+ participants.

<b>Sigma Intelligence Group</b>	<b>Mar. 2020 – Mar. 2021</b>
<i>Reviewer</i>	<i>Club of Seoul National University</i>

- Assessed projects for the Creative Engineering Fair, evaluating topics such as LIDAR, PLC control, and PID-based path planning techniques.

<b>OUTTA</b>	<b>Mar. 2021 – Jul. 2021</b>
<i>Organizer &amp; Instructor</i>	<i>Non-Profit for AI education</i>

- Organized 'The First Autonomous Driving Mini Car Coding and Contest' with *MIT Beaver Works*.
- Conducted Python programming workshops for 200+ underprivileged high school students, with 95% reporting improved confidence in coding.
- Led hands-on sessions for ROS and Gazebo, involving more than 30 participants.

## Skills

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- Languages: Python, C/ C++, MATLAB, Julia
- Frameworks: Pytorch, ROS, Git, MuJoCo, CoppeliaSim, IsaacGym, IsaacSim, PyBullet, OpenAI Gym, SB3
- Optimization: Gurobi, Eigen