

Kyuwon Weon

kyuwonweon2026@u.northwestern.edu | (412) 377-6730 | <https://www.linkedin.com/in/kyuwon-weon-a6bb2a213/>
<https://kyuwonweon.github.io/>

EDUCATION

Northwestern University | Evanston, IL December 2026 (expected)
Master of Science in Robotics

Carnegie Mellon University (CMU) | Pittsburgh, PA Aug 2018 - May 2022
Bachelor of Science in Mechanical & Biomedical Engineering (University Honors)

SKILLS

Robotics: ROS 2, MoveIt, TF2, OpenCV, Gazebo, MuJoCo, CoppeliaSim, RViz, SLAM, Pinocchio, ProxSuite
Software: Python, C++, C, PyTorch, Linux (Ubuntu), Git, Unit Testing, MATLAB, Minitab
Control: State-Space Modeling, Lagrangian Dynamics, PID, Forward/Inverse Kinematics, Motion Planning, VLM
Mechanical: SolidWorks, Creo, ANSYS, COMSOL, GD&T, Design for Six Sigma, DFM, Rapid Prototyping

PROFESSIONAL EXPERIENCE

Alcon | *Medical Device Design Engineer* | Fort Worth, TX Jul 2022 - Jul 2025

- Led the full-lifecycle design of intraocular lens(IOL) implant devices, utilizing rapid prototyping in Creo and Six Sigma to scale from initial concepts to high-volume injection molding
- Engineered custom test fixtures to validate system performance under dynamic loading conditions
- Executed Root Cause Analysis using DOEs and Minitab statistical methods to resolve critical failure modes

Alcon | *R&D Intern* | Belmont, CA Jun 2021 - Aug 2021

- Validated structural deformation predictions of fluid-accommodating IOL models via ANSYS
- Characterized the dynamic mechanical response of lens haptics under cyclic loading, analyzing stiffness and damping hysteresis to predict long-term positional stability

CMU Computational Bio-Modeling Lab | *Undergrad Researcher* | Pittsburgh, PA Sep 2020 - Dec 2020

- Accelerated reaction-diffusion simulations by 300x, training a PyTorch CNN on data generated using a custom C++ solver

PROJECTS

Robot-Agnostic Safety Control Architecture (CBF-QP) Jan 2026 - Present

- Architected a real-time high-frequency safety filter, utilizing Control Barrier Functions (CBF) and Quadratic Programming (QP) to mathematically guarantee collision prevention for any robotic manipulator
- Engineered Pinocchio-based kinematics pipeline in C++ with custom ROS 2 interface to handle whole-body constraints and dynamic obstacle interaction

Custom Brushless Motor Driver & Control Stack Jan 2026 - Present

- Designed a custom motor driver PCB, integrating H-bridges and current sensors to drive DC motors with sub-degree accuracy
- Programmed a nested control loop in C on a PIC32, utilizing timer interrupts to ensure deterministic real-time performance

Reactive Motion Planning & Stabilization Controller (APF) Dec 2025

- Implemented a reactive controller using Artificial Potential Fields in MuJoCo, ROS 2, and Python to navigate dynamic environments without pre-computed paths on a Franka Emika manipulator
- Engineered global damping algorithms to resolve local minima and high-frequency oscillations

VLM-Driven Interactive Writing Robot Dec 2025

- Co-developed a VLM-based agent that perceives questions and writes answers using ROS 2 and Python
- Implemented motion planning in MoveIt to generate pen gripping and writing trajectories, while optimizing force/torque safety thresholds to permit writing on a dynamic, handheld whiteboard

Autonomous Pen Grabbing Manipulator Sep 2025

- Programmed a PincherX-100 arm in Python to detect and grasp dynamic targets using OpenCV and RealSense