

Youngkyun Kim

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Education

Pohang University of Science and Technology (POSTECH)

Sep. 2025 – Present

Integrated M.S./Ph.D., Dept. of Electrical Engineering

GPA: 4.06 / 4.30

- **Passed the Ph.D. Qualifying Examination (Control, Electromagnetics), April 2026**
— in the first year of the integrated program

Pohang University of Science and Technology (POSTECH)

Feb. 2021 – Aug. 2025

B.S., Dept. of Electrical Engineering — graduated with honors

GPA: 3.60 / 4.30

Publications

- [2] **Kim, Y.**, & Kim, J. H. (2026, July 14–16). *Design of a hybrid Q-filter based repetitive controller for rejecting specific frequency disturbances in robot manipulators* [Conference presentation]. Korean Society of Manufacturing Technology Engineers (KSMTE) Conference, Gangneung.
- [1] **Kim, Y.**, & Kim, J. H. (2025, April 23). *State estimation methodology based on an extended Luenberger observer under specific disturbance conditions* [Conference presentation]. Institute of Electronics and Information Engineers (IEIE) Conference, Jeonbuk. $\hookrightarrow$ **Selected for the Undergraduate Outstanding Paper Award.**

Awards and Scholarships

Undergraduate Outstanding Paper Award — for paper [1] above

Apr. 2025

IEIE Society of System and Control & KIEE Information and Control Society

Baden-Württemberg-STIPENDIUM — competitive merit-based exchange award

2024 – 2025

Baden-Württemberg Stiftung, Germany

Jigok Scholarship (full tuition), POSTECH

2021 – 2024

Research Topics

Repetitive Control for Robot Manipulators under Periodic Disturbances

2026 – Present

- Designed a hybrid Q-filter combining selective-harmonic and low-pass structures to reject the periodic disturbances introduced by friction and gear backlash, and applied a direct correction to the delay length to offset the phase delay the filter introduces, which improved tracking performance in simulation.
- Used the monodromy operator to assess closed-loop stability, and found that the multiple delays introduced by the filter structure make its spectral computation intractable; currently formulating a two-step LMI design framework combining LQR cost bounds with H_∞ robustness objectives. **First-authored and presented at KSMTE 2026.**

Extended Luenberger Observer for State and Disturbance Estimation

2025

- Modeled step and sinusoidal disturbances as additional states, formed the augmented realizations, and checked the rank condition for detectability.
- Compared the augmented observer against a conventional Luenberger observer on a linearized robot manipulator model, confirming that the estimation error converges to zero for both disturbance types while the conventional observer retains a non-vanishing steady-state error. **First-authored and presented at IICC 2025; selected for the Undergraduate Outstanding Paper Award.**

Quadrupedal Locomotion Control

2025 – 2026

- Studied hybrid MPC and null-space-projection whole-body impulse control under friction-cone constraints, data-driven error modeling (ARMAV) within MPC, and smooth iLQR with saltation-matrix linearization for contact-event dynamics.

Graduate Activities

Research Project Participation, CTRL Lab., POSTECH

2025 – Present

- **Heavy-Duty Hydraulic Wheeled Humanoid and Teleoperation for Extreme Cold Environment Exploration** (MOTIE / KEIT, 2026–2030; consortium led by KIRO). Coordinated the POSTECH work package of the proposal: divided the writing among contributors, set each part's technical scope, and integrated the sections. Scope covers a VR and haptic-based master interface for dual-arm teleoperation, visual and tactile feedback of contact state and grasping force, and operator-intent-aware reference generation. **Selected; in progress.**
- Contributed to the POSTECH portion of a proposal for a **neuromorphic predictive control chip emulating the cerebellum** (led by KIST), covering hardware-in-the-loop coupling of the chip with a humanoid simulator.

Departmental and Laboratory Roles, POSTECH

2025 – Present

- Teaching assistant, Introduction to Automatic Control, Fall 2025. BK21 program liaison for the laboratory; produced the laboratory's promotional display material and prepared the advisor's curriculum vitae.

Experience

Undergraduate Researcher, CTRL Lab., POSTECH

Jan. 2024 – Aug. 2025

- Three semesters of undergraduate research participation: built and tuned controllers on QUANSER QUBE-Servo 2 and AERO platforms in MATLAB/Simulink, and presented a literature study on robust control of robot manipulators.

Exchange Student, University of Stuttgart — coursework in Optimal Control, funded by the Baden-Württemberg-STIPENDIUM

Sep. 2024 – Mar. 2025

Research Intern — BEVIL, MADs and IRAS Laboratories, POSTECH

2022 – 2024

- BEVIL (2023–2024, Capstone Design Project I–II): verification and test for an on-chip PRBS generator and checker, from RTL simulation to an FPGA demonstration.
- MADs (2023): RF MOSFET, frequency doubler and differential amplifier design. IRAS (2022): MUSIC-based direction-of-arrival estimation.

Undergraduate Activities

President, ELEVEN — POSTECH Football Club

2023

- Ran weekly training and competition with the club's executive committee, representing POSTECH in the football event of the POSTECH–KAIST Science War and organizing the annual UNIST and DGIST exchange matches.
- Worked with the university's student support office to have the club's stadium rental fees waived, obtain a dedicated club room, and fund travel for the POSTECH–KAIST–SNU exchange tournament.

Residential Advisor; Vice President, RA Council

Sep. 2023 – Jun. 2024

Division of Undergraduate Studies (Mueunjae) — advised first-year residents; as vice president, POSTECH
coordinated across advisors