

Dongjae Lee (이동재)

Incoming Assistant Professor at Mechanical Engineering, Kyung Hee University

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Research Interests

My research focuses on control algorithms for real-world robotic systems, integrating hardware design, classical and learning-based control, optimization, and system-level implementation. The goal is to develop reliable and explainable robotic systems while pursuing more efficient and practical applications. Current interests include *aerial/whole-body manipulation, multi-agent collaboration, and embodiment-aware robot learning algorithms*.

Education

Seoul National University

Ph.D. in Aerospace Engineering

- Advisor: Prof. H. Jin Kim
- Dissertation: nonprehensile aerial manipulation with robust stability guarantee

Seoul, South Korea

Sep 2020 – Feb 2025

Seoul National University

M.S. in Mechanical and Aerospace Engineering

- Advisor: Prof. H. Jin Kim
- Thesis: opening a hinged door with an aerial manipulator using model predictive control

Seoul, South Korea

Sep 2018 – Aug 2020

Seoul National University

B.S. in Mechanical and Aerospace Engineering

Seoul, South Korea

Mar 2014 – Feb 2018

Experience

Collaborating Visitor

Robotics Institute, Carnegie Mellon University

- Hosts: Prof. Guanya Shi and Prof. Sebastian Scherer
- Research on learning-based high-level policy for whole-body manipulation and cooperative manipulation
- Financial support by **NRF Postdoctoral Fellowship for Overseas Training**

Pittsburgh, United States

Sep 2025 – Feb 2026

Postdoctoral Researcher

Seoul National University

- Advisor: Prof. H. Jin Kim
- Organized a hands-on course on micro drone systems for approx. 40 students
- Advised and mentored Ph.D. students in aerial robotics research projects

Seoul, South Korea

Mar 2025 – Aug 2025

Visiting PhD Student

KTH Royal Institute of Technology

- Advisor: Prof. Dimos V. Dimarogonas
- Research on switching control of underactuated multi-channel system for cooperative manipulation
- Financial support by **BK Fellowship for Outstanding Graduate Students Overseas Training**

Stockholm, Sweden

Apr 2024 – Oct 2024

Honors and Awards

AWARDS

| | |
|------|---|
| 2025 | Outstanding Doctoral Dissertation Award |
| 2024 | BK Future Innovation Talent Award (Silver Prize) |
| 2021 | 2021 ICRA Best Paper Award on Unmanned Aerial Vehicles |
| 2020 | 2020 ICCAS Outstanding Paper Award |

Seoul National University

Seoul National University

IEEE

ICROS

FELLOWSHIPS

| | |
|-----------|--|
| 2025–2026 | NRF Postdoctoral Fellowship for Overseas Training |
| 2024 | BK Fellowship for Graduate Student Overseas Training |
| 2022–2023 | NRF Ph.D. Research Fellowship |
| 2021–2022 | BK Research Fellowship |

National Research Foundation of Korea (NRF)

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Seoul National University

Funded Projects

Multi-agent nonprehensile aerial manipulation

Pittsburgh, United States

Ministry of Education (MoE)

Sep 2025 – Feb 2026

- Leading the project as a recipient of the **NRF Postdoctoral Fellowship for Overseas Training**
- Integrated high-level policy and low-level control for cooperative aerial manipulation

Hands-on course on micro drone systems

Seoul, South Korea

Seoul National University (SNU)

Mar 2025 – Aug 2025

- Organized a course as part of a regional talent development program, and **led a team of graduate students**
- Lecture on PID control and dynamics for drones, followed by a hands-on session using micro drones

Tiltrotor design and collaborative aerial transportation

Seoul, South Korea

Ministry of Education (MoE)

Jun 2022 – May 2023

- Led the project as a recipient of the **NRF Ph.D. Research Fellowship**
- Two first-author papers in top-tier robotics conferences and one registered Korean patent

Landscape inspection and motion planning for industrial excavator

Seoul, South Korea

Hyundai Construction Equipment (HCE)

Feb 2020 – Dec 2022

- Co-led the motion planning part of the project
- Two first-author papers in top-tier venues: one conference and one journal paper

Development of specialized multirotor for transportation

Seoul, South Korea

Ministry of Trade, Industry and Energy (MoTIE)

Jan 2019 – Dec 2019

- Designed and prototyped an aerial pick-and-place mechanism
- Participated in field tests for validating the multirotor's transportation capability

Publications and Patents

* indicates equal contributions

THESIS

- [T1] **D. Lee**, [Nonprehensile Aerial Manipulation with Robust Stability Guarantee](#), Ph.D. Dissertation, 2025.
- [T2] **D. Lee**, [Opening a Hinged Door with an Aerial Manipulator using Model Predictive Control](#), Master's Thesis, 2020.

JOURNAL ARTICLES

- [J1] **D. Lee**, D. V. Dimarogonas, H. J. Kim, [Switching control of underactuated multi-channel systems with input constraints for cooperative manipulation](#), *IEEE Transactions on Control Systems Technology (TCST)* accepted.
- [J2] Y. Lim, S. Jung, D. Kim, **D. Lee**, H. J. Kim, [Safe Multimodal Replanning via Projection-based Trajectory Clustering in Crowded Environments](#), *IEEE Robotics and Automation Letters (RA-L)* accepted.
- [J3] **D. Lee***, B. Kim*, H. J. Kim, [Autonomous aerial manipulation at arbitrary pose in SE\(3\) with robust control and whole-body planning](#), *The International Journal of Robotics Research (IJRR)* accepted.
- [J4] S. Hwang*, **D. Lee***, C. Kim, H. J. Kim, [Autonomous heavy object pushing using a coaxial tiltrotor](#), *IEEE Transactions on Automation Science and Engineering (T-ASE)*, 2025.
- [J5] I. Jang*, J. Kim*, **D. Lee***, C. Kim*, C. Oh, Y. Kim, S. Woo, H. Sung, H. J. Kim, [Towards Fully Integrated Autonomous Excavation: Autonomous Excavator for Precise Earth Cutting and Onboard Landscape Inspection](#), *IEEE Robotics & Automation Magazine (RAM)*, 2025.
- [J6] G. Park, H. Park, W. Park, **D. Lee**, M. Kim, S. J. Lee, [The pallettrone cart: human-robot interaction-based aerial cargo transportation](#), *IEEE Robotics and Automation Letters (RA-L)*, 2024.
- [J7] J. Byun, J. Kim, D. Eom, **D. Lee**, C. Kim, H. J. Kim, [Image-based time-varying contact force control of aerial manipulator using robust impedance filter](#), *IEEE Robotics and Automation Letters (RA-L)*, 2024.
- [J8] W. Park, X. Wu, **D. Lee**, S. J. Lee, [Design, modeling and control of a top-loading fully-actuated cargo transportation multirotor](#), *IEEE Robotics and Automation Letters (RA-L)*, 2023.
- [J9] J. Byun, I. Jang, **D. Lee**, H. J. Kim, [A hybrid controller enhancing transient performance for an aerial manipulator extracting a wedged object](#), *IEEE Transactions on Automation Science and Engineering (T-ASE)*, 2023.
- [J10] **D. Lee**, J. Byun, H. J. Kim, [RISE-based trajectory tracking control of an aerial manipulator under uncertainty](#), *IEEE Control Systems Letters (LCSS)*, 2022.
- [J11] **D. Lee**, H. Seo, I. Jang, S. J. Lee, H. J. Kim, [Aerial manipulator pushing a movable structure using a DOB-based robust controller](#), *IEEE Robotics and Automation Letters (RA-L)*, 2021, **2021 ICRA Best Paper Award on Unmanned Aerial Vehicles**.
- [J12] S. J. Lee, **D. Lee**, J. Kim, D. Kim, I. Jang, H. J. Kim, [Fully actuated autonomous flight of thruster-tilting multirotor](#), *IEEE/ASME Transactions on Mechatronics (T-MECH)*, 2021.

CONFERENCE PROCEEDINGS

- [C1] J. Lee*, **D. Lee***, Y. Kim H. Lee, H. J. Kim, *Geometric Backstepping Control of Omnidirectional Tiltrotors Incorporating Servo-Rotor Dynamics for Robustness against Sudden Disturbances*, accepted to 2026 IEEE International Conference on Robotics and Automation (**ICRA**), 2026.
- [C2] H. Gupta, X. Gao, H. Ha, C. Pan, M. Cao, **D. Lee**, S. Scherer, S. Song, G. Shi, *UMI-on-Air: Embodiment-Aware Guidance for Embodiment-Agnostic Visuomotor Policies*, accepted to 2026 IEEE International Conference on Robotics and Automation (**ICRA**), 2026.
- [C3] J. Byun, Y. Kim, **D. Lee**, H. J. Kim, *Safety-critical control for aerial physical interaction in uncertain environment*, 2025 IEEE International Conference on Robotics and Automation (**ICRA**), 2025.
- [C4] **D. Lee**, H. J. Kim, *Saturated RISE control for considering rotor thrust saturation of fully actuated multirotor*, 2024 International Conference on Unmanned Aircraft Systems (**ICUAS**), 2024.
- [C5] **D. Lee**, S. Hwang, J. Byun, S. J. Lee, H. J. Kim, *Autonomous aerial perching and unperching using omnidirectional tiltrotor and switching controller*, 2024 IEEE International Conference on Robotics and Automation (**ICRA**), 2024.
- [C6] D. D. Oh*, **D. Lee***, H. J. Kim, *Safety-critical control under multiple state and input constraints and application to fixed-wing UAV*, 2023 IEEE Conference on Decision and Control (**CDC**), 2023.
- [C7] **D. Lee**, S. Hwang, C. Kim, S. J. Lee, H. J. Kim, *Minimally actuated tiltrotor for perching and normal force exertion*, 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2023.
- [C8] B. Kim, **D. Lee**, J. Byun, H. J. Kim, *Globally defined dynamic modelling and geometric tracking controller design for aerial manipulator*, 2023 IEEE International Conference on Robotics and Automation (**ICRA**), 2023.
- [C9] J. Byun, **D. Lee**, H. Seo, I. Jang, J. Choi, H. J. Kim, *Stability and robustness analysis of plug-pulling using an aerial manipulator*, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
- [C10] **D. Lee***, I. Jang*, J. Byun, H. Seo, H. J. Kim, *Real-time motion planning of a hydraulic excavator using trajectory optimization and model predictive control*, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
- [C11] I. Jang, **D. Lee**, S. Lee, H. J. Kim, *Robust and recursively feasible real-time trajectory planning in unknown environments*, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
- [C12] **D. Lee**, H. Seo, D. Kim, H. J. Kim, *Aerial manipulation using model predictive control for opening a hinged door*, 2020 IEEE International Conference on Robotics and Automation (**ICRA**), 2020.
- [C13] H. Seo, C. Y. Son, **D. Lee**, H. J. Kim, *Trajectory planning with safety guaranty for a multirotor based on the forward and backward reachability analysis*, 2020 IEEE International Conference on Robotics and Automation (**ICRA**), 2020.
- [C14] S. J. Lee, **D. Lee**, H. J. Kim, *Cargo transportation strategy using T 3-Multirotor UAV*, 2019 IEEE International Conference on Robotics and Automation (**ICRA**), 2019.

MANUSCRIPTS UNDER REVIEW

- [M1] **D. Lee***, Y. Wang*, X. Guo*, Y. Zhan, Y. Jiang, M. Cao, J. Xie, C. Mao, S. Scherer, J. Geng, G. Shi, *AM-Bench: A Modular Simulation Suite and Benchmark for Aerial Manipulation Policy Learning*, under review (conference submission).

PATENTS

- [P1] H. J. Kim, **D. Lee**, *5 자유도 비행체 및 제어방법 (5 Degrees-of-Freedom Aerial Vehicle and Control Method)*, Korean Patent, Patent No. 10-2854901, PCT Application No. PCT/KR2024/095089., 2025.

Teaching

Hands-on course on micro drone systems

Seoul National University

Siheung, South Korea

Mar 2025 – Aug 2025

- Organized and led a course, instructing approximately 40 undergraduate students from other universities
- Encouraged active student participation through a drone racing-style competition

Engineering mathematics

HOLIX (formerly Educast)

Seoul, South Korea

Nov 2017 – Jun 2018

- Delivered an online lecture series on engineering mathematics for undergraduate students
- Attracted more than 1,500 enrolled learners