

# Dongjae Lee

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## Education

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### Seoul National University

Ph.D. in Aerospace Engineering

- Advisor: Prof. H. Jin Kim
- Dissertation: nonprehensile aerial manipulation with robust stability guarantee
- Cumulative GPA: 4.05/4.30

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
- Cumulative GPA: 4.19/4.30

Seoul, South Korea

Sep 2018 – Aug 2020

### Seoul National University

B.S. in Mechanical and Aerospace Engineering

- Cumulative GPA: 3.82/4.30

Seoul, South Korea

Mar 2014 – Feb 2018

## Experiences

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### Collaborating Visitor

Robotics Institute, Carnegie Mellon University

- Advisors: Prof. Guanya Shi and Prof. Sebastian Scherer
- Financial support by **NRF Postdoctoral Fellowship for Overseas Training**

Pittsburgh, United States

Sep 2025 – Present

### Postdoctoral Researcher

Seoul National University

- Advisor: Prof. H. Jin Kim
- Organized a hands-on course on micro drone systems for approx. 40 students

Seoul, South Korea

Mar 2025 – Aug 2025

### Visiting PhD Student

KTH Royal Institute of Technology

- Advisor: Prof. Dimos V. Dimarogonas
- Financial support by **BK Fellowship for Outstanding Graduate Students Overseas Training**

Stockholm, Sweden

Apr 2024 – Oct 2024

## Honors

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### AWARDS

2025	Outstanding Doctoral Dissertation Award
2024	BK Future Innovation Talent Award (Silver Prize)
2022	BK Aerospace Excellence Research Award
2021	<b>2021 ICRA Best Paper Award</b> on Unmanned Aerial Vehicles
2020	2020 ICCAS Outstanding Paper Award

Seoul National University, South Korea

Seoul National University, South Korea

Seoul National University, South Korea

IEEE

ICROS, South Korea

### FELLOWSHIP

2025–2026	NRF Postdoctoral Fellowship for Overseas Training
2024	BK Fellowship for Outstanding Graduate Student Overseas Training
2022–2023	NRF Ph.D. Research Fellowship
2021–2022	BK Research Fellowship
2016	National Scholarship

National Research Foundation, South Korea

National Research Foundation, South Korea

National Research Foundation, South Korea

Seoul National University, South Korea

Korea Student Aid Foundation, South Korea

## Projects

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### Multi-agent nonprehensile aerial manipulation

Ministry of Education (MoE)

- leading the project as a recipient of the **NRF Postdoctoral Fellowship for Overseas Training**
- learning-based trajectory optimization and constrained adaptive control

United States

Sep 2025 – Present

## Short course on micro drone systems

Seoul National University

- organized a course as part of a regional talent development program, and **led a team of graduate students**

South Korea

Mar 2025 – Aug 2025

## Tiltrotor design and collaborative transportation

Ministry of Education (MoE)

- led the project as a recipient of the **NRF Ph.D. Research Fellowship**
- platform design, control and experiments

South Korea

Jun 2022 – May 2023

## Landscape inspection and motion planning for automating industrial excavator

Hyundai Construction Equipment (HCE)

- optimization-based motion planning and outdoor experiment

South Korea

Feb 2020 – Dec 2022

## Precise aerial manipulation with autonomous drones

Ministry of Trade, Industry and Energy (MoTIE)

- outdoor experiment of cooperative aerial transportation

South Korea

Feb 2020 – May 2020

## Development of specialized multirotor for transportation

Ministry of Trade, Industry and Energy (MoTIE)

- pick-and-place mechanism design and outdoor experiment

South Korea

Jan 2019 – Dec 2019

## Publications

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\* indicates equal contributions

### JOURNAL ARTICLES

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

### CONFERENCE PROCEEDINGS

- [C1] Safety-critical control for aerial physical interaction in uncertain environment  
J. Byun, Y. Kim, **D. Lee**, H. J. Kim  
*2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025.
- [C2] Saturated RISE control for considering rotor thrust saturation of fully actuated multirotor  
**D. Lee**, H. J. Kim  
*2024 International Conference on Unmanned Aircraft Systems (ICUAS)*, 2024.

- [C3] Autonomous aerial perching and unperching using omnidirectional tiltrotor and switching controller  
D. Lee, S. Hwang, J. Byun, S. J. Lee, H. J. Kim  
2024 IEEE International Conference on Robotics and Automation (**ICRA**), 2024.
  - [C4] Safety-critical control under multiple state and input constraints and application to fixed-wing UAV  
D. D. Oh\*, D. Lee\*, H. J. Kim  
2023 IEEE Conference on Decision and Control (**CDC**), 2023.
  - [C5] Minimally actuated tiltrotor for perching and normal force exertion  
D. Lee, S. Hwang, C. Kim, S. J. Lee, H. J. Kim  
2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2023.
  - [C6] Globally defined dynamic modelling and geometric tracking controller design for aerial manipulator  
B. Kim, D. Lee, J. Byun, H. J. Kim  
2023 IEEE International Conference on Robotics and Automation (**ICRA**), 2023.
  - [C7] Stability and robustness analysis of plug-pulling using an aerial manipulator  
J. Byun, D. Lee, H. Seo, I. Jang, J. Choi, H. J. Kim  
2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
  - [C8] Real-time motion planning of a hydraulic excavator using trajectory optimization and model predictive control  
D. Lee\*, I. Jang\*, J. Byun, H. Seo, H. J. Kim  
2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
  - [C9] Robust and recursively feasible real-time trajectory planning in unknown environments  
I. Jang, D. Lee, S. Lee, H. J. Kim  
2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2021.
  - [C10] Aerial manipulation using model predictive control for opening a hinged door  
D. Lee, H. Seo, D. Kim, H. J. Kim  
2020 IEEE International Conference on Robotics and Automation (**ICRA**), 2020.
  - [C11] Trajectory planning with safety guaranty for a multirotor based on the forward and backward reachability analysis  
H. Seo, C. Y. Son, D. Lee, H. J. Kim  
2020 IEEE International Conference on Robotics and Automation (**ICRA**), 2020.
  - [C12] Cargo transportation strategy using T 3-Multirotor UAV  
S. J. Lee, D. Lee, H. J. Kim  
2019 IEEE International Conference on Robotics and Automation (**ICRA**), 2019.

MANUSCRIPTS UNDER REVIEW / IN PREPARATION

- [M1] Geometric Backstepping Control of Omnidirectional Tiltrotors Incorporating Servo-Rotor Dynamics for Robustness against Sudden Disturbances  
J. Lee\*, D. Lee\*, Y. Kim H. Lee, H. J. Kim  
*under review (conference submission).*
  - [M2] UMI-on-Air: Embodiment-Aware Guidance for Embodiment-Agnostic Visuomotor Policies  
H. Gupta, X. Gao, H. Ha, C. Pan, M. Cao, D. Lee, S. Scherer, S. Song, G. Shi  
*under review (conference submission).*
  - [M3] Aerial physical interaction with robust stability guarantee against sudden collision and contact-loss  
D. Lee, J. Byun, H. J. Kim  
*under review (journal submission).*
  - [M4] Switching control of underactuated multi-channel systems with input constraints for cooperative manipulation  
D. Lee, D. V. Dimarogonas, H. J. Kim  
*under review (journal submission).*

# **Invited Presentations**

- **Robust Nonprehensile Aerial Manipulation**  
2025 KIAS mini workshop on AI and Robotics
  - **Nonprehensile pushing manipulation from pusher and object perspectives**  
Robotics group in Dept. of mechanical system design engineering
  - **Aerial physical interaction with a movable object**  
Flying robots group, institute of robotics and mechatronics
  - **Aerial physical interaction with a possibly movable object**  
Distributed hybrid systems group (Online)

Korea Institute for Advanced Study (KIAS), South Korea  
Feb 2025

SeoulTech, South Korea  
Nov 2024

German Aerospace Center (DLR), Germany  
Jul 2024

KTH Royal Institute of Technology, Sweden  
Dec 2023