

# Dongjae Lee

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## Research Interests

Aerial Manipulation, Robot-Environment Interaction, Robust Control, Model Predictive Control, Motion Planning

## Education

### Seoul National University

Ph.D. candidate in Aerospace Engineering

- Advisor: Prof. H. Jin Kim
- Research Focus: aerial manipulation for robot-environment interaction

Seoul, South Korea

Sep 2020 – present

### 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

## Experiences

### Visiting PhD student

KTH Royal Institute of Technology

- Advisor: Prof. Dimos Dimarogonas
- Research focus: collaborative manipulation, distributed control

Stockholm, Sweden

Apr 2024 – present

### Online Education Mentor

Engineering Mathematics

HOLIX (former: Educast)

Seoul, South Korea

Dec 2017 – Jun 2018

## Honors

### AWARDS

2024	BK Future Innovation Talent Award (Silver Prize)	Seoul National University, South Korea
2022	BK Aerospace Excellence Research Award	Seoul National University, South Korea
2021	<b>2021 ICRA Best Paper Award</b> on Unmanned Aerial Vehicles	IEEE
2020	2020 ICCAS Outstanding Paper Award	ICROS, South Korea

### FELLOWSHIP

2024	BK Fellowship for Outstanding Graduate Student Overseas Training	National Research Foundation (NRF), South Korea
2022–2023	Ph.D. Research Fellowship	National Research Foundation (NRF), South Korea
2021–2022	BK Research Fellowship	Seoul National University, South Korea
2016	National Scholarship	Korea Student Aid Foundation, South Korea

## Projects

### Tiltrotor design and collaborative transportation

Ministry of Education (MoE)

- platform design, control & experiments, **led the team of graduate students**

South Korea

Jun 2022 – May 2023

### Landscape inspection and motion planning for automating industrial excavator

Hyundai Construction Equipment (HCE)

- optimization-based motion planning & 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

- pick-and-place mechanism design & outdoor experiment

## Skills

**Programming** C/C++, Matlab, Simulink, ROS, Python

**Language** Korean (native), English (proficient)

**Tools** Vim, Git, Solidworks, Onshape

## Publications

### JOURNAL ARTICLES

\* indicates equal contributions

- [J1] Autonomous Excavator for Precise Earthcutting 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)* accepted.
- [J2] 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 (RAL)* 9.5 (2024) pp. 4854–4861. IEEE, 2024.
- [J3] 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 (RAL)* 8.9 (2023) pp. 5807–5814. IEEE, 2023.
- [J4] 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 (TASE)* (2023). IEEE, 2023.
- [J5] RISE-based trajectory tracking control of an aerial manipulator under uncertainty  
**D. Lee**, J. Byun, H. J. Kim  
*IEEE Control Systems Letters (LCSS)* 6 (2022) pp. 3379–3384. IEEE, 2022.
- [J6] 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 (RAL)* 6.2 (2021) pp. 723–730. IEEE, 2021.
- [J7] 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 (TMECH)* 26.2 (2021) pp. 765–776. IEEE, 2021.

### CONFERENCE PROCEEDINGS

\* indicates equal contributions

- [C1] 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)* accepted, 2024.
- [C2] Autonomous aerial perching and unperching using omnidirectional tiltrotor and switching controller  
**D. Lee**, S. Hwang, J. Byun, S. J. Lee, H. J. Kim  
*2024 International Conference on Robotics and Automation (ICRA)* accepted, 2024.
- [C3] 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.
- [C4] 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.
- [C5] 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.
- [C6] 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.
- [C7] 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.
- [C8] 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.

- [C9] 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.
- [C10] 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.
- [C11] Cargo transportation strategy using T 3-Multirotor UAV  
S. J. Lee, **D. Lee**, H. J. Kim  
*2019 International Conference on Robotics and Automation (ICRA)*, 2019.

## MANUSCRIPTS UNDER REVIEW / IN PREPARATION

\* indicates equal contributions

- [M1] Autonomous Heavy Object Pushing Using a Coaxial Tiltrotor  
S. Hwang\*, **D. Lee**\*, C. Kim, H. J. Kim  
*submitted to IEEE Transactions on Automation Science and Engineering (TASE)*.
- [M2] Aerial physical interaction with robust stability guarantee against sudden collision and contact-loss  
**D. Lee**, J. Byun, H. J. Kim  
*submitted to IEEE Transactions on Robotics (TRO)*.
- [M3] Robust Omnidirectional Aerial Manipulation with Enlarged Workspace  
**D. Lee**\*, B. Kim\*, H. J. Kim  
*in preparation.*

## Academic Services

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- Journal reviewer for IEEE RAL 2021–2024
- Journal reviewer for IEEE/ASME TMECH 2021, 2023
- Journal reviewer for IEEE TASE 2021, 2023–2024
- Journal reviewer for IEEE TAC 2024
- Journal reviewer for IEEE LCSS 2022
- Journal reviewer for IEEE ACCESS 2020
- Journal reviewer for Springer IJCAS 2019, 2021–2024
- Conference reviewer for IEEE ICRA 2020–2023
- Conference reviewer for IEEE IROS 2023

## Reference

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Prof. H. Jin Kim, Seoul National University, hjinkim@snu.ac.kr