

Dongjae Lee

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Research Interests

Aerial Manipulation, Robot-Environment Interaction, Robust Control, Model Predictive Control, Multi-agent Control

Education

Seoul National University

Seoul, South Korea

Ph.D. candidate in Aerospace Engineering

Sep 2020 – present

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

Seoul National University

Seoul, South Korea

M.S. in Mechanical and Aerospace Engineering

Sep 2018 – Aug 2020

- Advisor: Prof. H. Jin Kim
- Thesis: Opening a Hinged Door with an Aerial Manipulator using Model Predictive Control

Seoul National University

Seoul, South Korea

B.S. in Mechanical and Aerospace Engineering

Mar 2014 – Feb 2018

Experiences

Visiting PhD student

Stockholm, Sweden

KTH Royal Institute of Technology

Apr 2024 – present

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

Online Education Mentor

Seoul, South Korea

Engineering Mathematics

Dec 2017 – Jun 2018

HOLIX (former: Educast)

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	2021 ICRA Best Paper Award 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

South Korea

Ministry of Education (MoE)

Jun 2022 – May 2023

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

Landscape inspection and motion planning for automating industrial excavator

South Korea

Hyundai Construction Equipment (HCE)

Feb 2020 – Dec 2022

- optimization-based motion planning & outdoor experiment

Precise aerial manipulation with autonomous drones

South Korea

Ministry of Trade, Industry and Energy (MoTIE)

Feb 2020 – May 2020

- outdoor experiment of cooperative aerial transportation

Development of specialized multirotor for transportation

South Korea

Ministry of Trade, Industry and Energy (MoTIE)

Jan 2019 – Dec 2019

- pick-and-place mechanism design & outdoor experiment

Programming C/C++, Matlab, Simulink, ROS, Python
Language Korean (native), English (proficient)
Tools Git, CAD(Solidworks, Onshape), Optimization Toolbox/Solver(Acados, CasADi, CPLEX)

Publications

* indicates equal contributions

JOURNAL ARTICLES

- [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 (RA-L) 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 (RA-L) 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 (T-ASE) (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 (RA-L) 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 (T-MECH) 26.2 (2021) pp. 765–776. IEEE, 2021.

CONFERENCE PROCEEDINGS

- [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

- [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 (T-ASE).
- [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 (T-RO).
- [M3] Robust Omnidirectional Aerial Manipulation with Enlarged Workspace
D. Lee*, B. Kim*, H. J. Kim
submitted to IEEE Transactions on Robotics (T-RO).

Academic Services

- 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

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