

# Jeonghyun Byun, Ph.D.

POSTDOCTORAL RESEARCHER

Automation and Systems Research Institute (ASRI), Seoul National University, Seoul, Republic of Korea

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## Education

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### Seoul National University

PH.D. IN AEROSPACE ENGINEERING

Seoul, Republic of Korea

2020.03.02 - 2025.02.26

- Dissertation: Aerial physical interaction strategy considering changes in dynamics
- Advisor: Prof. H. Jin Kim

### Seoul National University

B.S. IN AEROSPACE ENGINEERING

Seoul, Republic of Korea

2016.03.02 - 2020.02.26

- Graduated **top of the department**
- Awarded Summa Cum Laude (GPA: 4.05/4.3)

## Professional Experience

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### Automation and Systems Research Institute (ASRI), Seoul National University

Seoul, Republic of Korea

2025.03.01 -

POSTDOCTORAL RESEARCHER

- Alternative military service as technical research personnel
- Supervisor: Prof. H. Jin Kim (PI)

## Publications

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### MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

Lin Yang<sup>1</sup>, Jinwoo Lee, Domenico Campolo, H. Jin Kim, **Jeonghyun Byun**<sup>†</sup> “Planning and Control of Aerial Manipulator in Complex Environments with Superquadrics.”

*Under review, Mechatronics*

**Jeonghyun Byun**<sup>1</sup>, Dongjae Lee, Dohyun Eom, H. Jin Kim. “Motion/force control against discontinuous contact and friction forces for aerial push-and-slide operation.”

*Under review, IEEE Transactions on Control Systems Technology*

Yongjae Lim<sup>1</sup>, Youngmin Yoon, **Jeonghyun Byun**, Sangyoon Kim, and H. Jin Kim. “Reachable-Set-based Trajectory Sampling for Local Planning of Autonomous Vehicles.”

*Under review, IEEE Access*

Dongjae Lee<sup>1</sup>, **Jeonghyun Byun**, H. Jin Kim. “Aerial Physical Interaction with Robust Stability Guarantee Against Sudden Collision and Contact Loss.”

*In preparation (journal submission)*

### JOURNALS ARTICLES

Yeongin Song<sup>1</sup>, Hyunmin Kim<sup>1</sup>, **Jeonghyun Byun**, Keun Park, Murim Kim, and Seung Jae Lee. “Aerial Dockable Multirotor UAVs: Design, Control and Flight Time Extension through In-flight Battery Replacement.” **IEEE Access**, 2025

**Jeonghyun Byun**<sup>1</sup>, Junha Kim, Dohyun Eom, Dongjae Lee, Changhyeon Kim, H. Jin Kim. “Image Based Time-Varying Contact Force Control of Aerial Manipulator using Robust Impedance Filter.” **IEEE Robotics and Automation Letters (RA-L)**, 2024.

*\*Orally presented at IROS 2024 held in Abu Dhabi, UAE.*

**Jeonghyun Byun**<sup>1</sup>, Inkyu Jang, Dongjae Lee, H. Jin 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.

*\*Orally presented at ICRA 2024 held in Yokohama, Japan.*

Dongjae Lee<sup>1</sup> **Jeonghyun Byun**, H. Jin Kim. "RISE-based trajectory tracking control of an aerial manipulator under uncertainty." IEEE Control Systems Letters (**L-CSS**), 2022.

## PEER-REVIEWED CONFERENCES

**Jeonghyun Byun**<sup>1</sup>, Yeonjoon Kim, Dongjae Lee, H. Jin Kim. "Safety-Critical Control for Aerial Physical Interaction in Uncertain Environment." 2025 International Conference on Robotics and Automation (**ICRA**).

**Jeonghyun Byun**<sup>1</sup>, Dohyun Eom, H. Jin Kim. "Haptic-Based Bilateral Teleoperation of Aerial Manipulator for Extracting Wedged Object with Compensation of Human Reaction Time." 2024 International Conference on Unmanned Aircraft Systems (**ICUAS**).

Dongjae Lee<sup>1</sup>, Sunwoo Hwang, **Jeonghyun Byun**, H. Jin Kim. "Autonomous Aerial Perching and Unperching Using Omni-directional Tiltrotor and Switching Controller." 2024 International Conference on Robotics and Automation (**ICRA**).

Inkyu Jang<sup>1</sup>, Sunwoo Hwang, **Jeonghyun Byun**, H. Jin Kim. "Safe Receding Horizon Motion Planning with Infinitesimal Update Interval." 2024 International Conference on Robotics and Automation (**ICRA**).

**Jeonghyun Byun**<sup>1</sup>, Byeongjun Kim, Changhyeon Kim, Donggeon David Oh, H. Jin Kim. "Stable Contact Guaranteeing Motion/Force Control for an Aerial Manipulator on an Arbitrarily Tilted Surface." 2023 International Conference on Robotics and Automation (**ICRA**).

Byeongjun Kim<sup>1</sup>, Dongjae Lee, **Jeonghyun Byun**, H. Jin Kim. "Globally Defined Dynamic Modelling and Geometric Tracking Controller Design for Aerial Manipulator." 2023 International Conference on Robotics and Automation (**ICRA**).

Dongjae Lee<sup>1</sup>, Inkyu Jang<sup>1</sup>, **Jeonghyun Byun**, Hoseong Seo, H. Jin 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**).

**Jeonghyun Byun**<sup>1</sup>, Dongjae Lee, Hoseong Seo, Inkyu Jang, Jeongjun Choi, H. Jin Kim. "Stability and Robustness Analysis of Plug-Pulling using an Aerial Manipulator." 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**).

## Projects

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### Research and Education on Defense Intelligent Swarm System

South Korea

2024.07.01 - Present

MINISTRY OF SCIENCE AND ICT

(Leading the team of graduate students) Proceed on control and planning of single and multiple unmanned aerial vehicles

South Korea

### Autonomous Wheel Loader

2023.03.01 - Present

HYUNDAI CONSTRUCTION EQUIPMENT (HCE)

(Leading the team of graduate students) Develop trajectory generation strategy for V-shape maneuver and loading/unloading of a wheel loader,

South Korea

2021.12.01 - 2022.03.31

### Hybrid Motion/Force Controller for Underactuated Aerial Manipulator

BRAINKOREA21PLUS

(Independent Research Project) Design a transient performance-enhancing hybrid motion/force controller for an underactuated multirotor equipped with added equipment

South Korea

2021.06.01 - 2022.05.01

### Friction Coefficient Estimation

HYUNDAI MOTORS

Physically estimate friction coefficient between car's tire and road

South Korea

2020.09.01 - 2021.01.01

### Autonomous Excavator

HYUNDAI CONSTRUCTION EQUIPMENT (HCE)

Design external wrench estimator for excavator path-planning

## Honors

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### AWARDS

2025.07	<b>Selected Paper for Journal Submission - 40th ICROS Annual Conference</b> , Institute of Control, Robotics and Systems ( <b>ICROS</b> )
2022.11	<b>Third Prize, Aerospace Paper Award</b> , Korea Aerospace Industries ( <b>KAI</b> ), LTD.
2020.02	<b>Top Graduate Award</b> , Department of Aerospace Engineering, Seoul National University
2020.02	<b>Summa Cum Laude</b> , Department of Aerospace Engineering, Seoul National University
2018.09	<b>Special Recognition</b> , 7th SNU Creative Design Fair, College of Engineering, Seoul National University
2017.09	<b>Special Recognition</b> , 6th SNU Creative Design Fair, College of Engineering, Seoul National University

## FELLOWSHIPS

2021.11 – 2022.02	<b>BK21 Excellent Research Talent Fellowship</b> , BrainKorea21PLUS
2020.03 – 2020.08	<b>BK21 PLUS Doctoral Fellowship</b> , BrainKorea21PLUS
2019.03 – 2020.02	<b>Eminence scholarship</b> , Seoul National University
2018.11	<b>KAI-KSAS Scholarship</b> , Korean Aerospace Industry & Korean Society for Aeronautical and Space Sciences
2018.03 – 2019.02	<b>Sinyang Cultural Foundation Scholarship</b> , Sinyang Cultural Foundation
2017.03 – 2018.02	<b>Eminence scholarship</b> , Seoul National University
2016.09 – 2017.02	<b>Merit Based scholarship</b> , Seoul National University

## Invited Presentations

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2025.10.	<b>Aerial Physical Interaction Strategy Considering Changes in Dynamics</b> , Workshop on Advanced Aerial Robotics at Dragon Lab, University of Tokyo
2025.10.	<b>Safety-Critical Aerial Physical Interaction</b> , Advancements in Aerial Physical Interaction (Workshop) in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
2025.05.	<b>Introduction to Drone Research in LARR (Korean)</b> , Seoul National University

## Academic Services

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- **Journal reviewer for IJRR**, 2025
- **Journal reviewer for IEEE T-RO**, 2021, 2024
- **Journal reviewer for IEEE T-ASE**, 2023 - 2024
- **Journal reviewer for IEEE T-IE**, 2025
- **Journal reviewer for Springer IJCAS**, 2023
- **Conference reviewer for IEEE ICRA**, 2022-2023, 2025
- **Conference reviewer for IEEE IROS**, 2023, 2025

## Teaching Experiences

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2021.03 -	<b>Tutor, Engineering Maths 1, Seoul National University</b> , Solved several difficult problem sets
2021.06	
2020.09 -	<b>TA, Introductory Engineering Probability, Seoul National University</b> , Developed scoring criteria for the exams
2020.12	
2020.09 -	<b>Tutor, Physics 2, Seoul National University</b> , Solved several difficult problem sets
2020.12	
2020.03 -	<b>TA, Engineering Maths 1, Seoul National University</b> , Developed scoring criteria for the exams
2020.06	
2017.03 -	<b>Tutor, Physics, Seoul National University</b> , Solved some difficult problem sets
2018.06	

## Skills

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**Programming:** C/C++, Python, ROS, MATLAB/Simulink, Arduino

**Language:** Korean (native), English (proficient), French (elementary)

**Tools:** Git, CAD (Solidworks, Fusion360, Onshape), Optimization Toolbox/Solver (CasADi, CPLEX)

## References

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

**Prof. Domenico Campolo** (Nanyang Technological University, d.campolo@ntu.edu.sg)

**Prof. Seungjae Lee** (Seoul National University of Science and Technology, seungjae\_lee@seoultech.ac.kr)