

# 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

POSTDOCTORAL RESEARCHER

2025.03.01 -

- Supervisor: Prof. H. Jin Kim (PI)

## Publications

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### MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

**Jeonghyun Byun**<sup>1</sup>, Dongjae Lee, Dohyun Eom, H. Jin Kim. “Motion/Force Control for Aerial Push-and-Slide under Discontinuous Interaction Force.”  
*In preparation (journal submission)*

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)*

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.”  
*Under Review (IEEE Access)*

### JOURNALS ARTICLES

**Jeonghyun Byun**<sup>1</sup>, Junha Kim, Dohyun Eom, Dongjae Lee, Changhyeon Kim, H. Jin Kim. “Imaged-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 Omnidirectional 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

MINISTRY OF SCIENCE AND ICT

2024.07.01 - Present

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

### Autonomous Wheel Loader

South Korea

HYUNDAI CONSTRUCTION EQUIPMENT (HCE)

2023.03.01 - Present

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

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

South Korea

BRAIN KOREA21 PLUS

2021.12.01 - 2022.03.31

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

### Friction Coefficient Estimation

South Korea

HYUNDAI MOTORS

2021.06.01 - 2022.05.01

Physically estimate friction coefficient between car's tire and road

### Autonomous Excavator

South Korea

HYUNDAI CONSTRUCTION EQUIPMENT (HCE)

2020.09.01 - 2021.01.01

Design external wrench estimator for excavator path-planning

## Honors

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### AWARDS

2022.11 **Honorable Mention, Aerospace Paper Award**, Korea Aerospace Industries (KAI), LTD.

2020.02 **Top Graduate Award**, Department of Aerospace Engineering, Seoul National University

2020.02 **Summa Cum Laude**, Department of Aerospace Engineering, Seoul National University

2018.09 **Special Recognition**, 7th SNU Creative Design Fair, College of Engineering, Seoul National University

2017.09 **Special Recognition**, 6th SNU Creative Design Fair, College of Engineering, Seoul National University

## FELLOWSHIPS

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

## Invited Presentations

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- 2024.02 **Hybrid Controllers for Aerial Physical Interaction**, Inria centre at Rennes 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 - 2021.06 **Tutor, Engineering Maths 1, Seoul National University**, Solved several difficult problem sets
- 2020.09 - 2020.12 **TA, Introductory Engineering Probability, Seoul National University**, Developed scoring criteria for the exams
- 2020.09 - 2020.12 **Tutor, Physics 2, Seoul National University**, Solved several difficult problem sets
- 2020.03 - 2020.06 **TA, Engineering Maths 1, Seoul National University**, Developed scoring criteria for the exams
- 2017.03 - 2018.06 **Tutor, Physics, Seoul National University**, Solved some difficult problem sets

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

**Prof. Jungwon Park** (Seoul National University of Science and Technology, jungwonpark@seoultech.ac.kr)