# Jeonghyun Byun, Ph.D.

Postdoctoral Researcher

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

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## Education

**Seoul National University** *Seoul, Republic of Korea*

Ph.D. in Aerospace Engineering *2020.03.02 - 2025.02.26*

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

**Seoul National University** *Seoul, Republic of Korea*

B.S. in Aerospace Engineering *2016.03.02 - 2020.02.26*

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

## Professional Experience

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

Postdoctoral Researcher *2025.03.01 -*

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

## Publications

### Manuscripts Under Review or In Preparation

Lin Yang[1], Jinwoo Lee, Domenico Campolo, H. Jin Kim, **Jeonghyun Byun**[†] "Planning and Control of Aerial Manipulator in Complex Environments with Superquadrics."
*Under review*, **Mechatronics**

**Jeonghyun Byun**[1], 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[1], 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[1], **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[1], Hyunmin Kim[1], **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**[1], 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**[1], 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[1] **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**[1], 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**[1], 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[1], 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[1], 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**[1], 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[1], 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[1], Inkyu Jang[1], **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**[1], 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

**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*
BrainKorea21PLUS *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

### Awards

2025.07 **Selected Paper for Journal Submission - 40th ICROS Annual Conference**, Institute of Control, Robotics and Systems (**ICROS**)
2022.11 **Third Prize, 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

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

## Academic Services

- **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

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

**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

**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)