

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

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

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

Jeonghyun Byun¹, Dongjae Lee, Dohyun Eom, H. Jin Kim. "Motion/Force Control for Reliable Aerial Push-and-Slide Operation Against Discontinuous Contact and Friction Forces."
In preparation (journal submission)

Dongjae Lee¹, **Jeonghyun Byun**, H. Jin Kim. "Aerial Physical Interaction with Robust Stability Guarantee Against Sudden Collision and Contact Loss."
In preparation (journal submission)

Yongjae Lim¹, Youngmin Yoon, **Jeonghyun Byun**, Sangyoon Kim, and H. Jin Kim. "Reachable-Set-based Trajectory Sampling for Local Planning of Autonomous Vehicles."
Under Review, IEEE Transactions on Intelligent Transportation Systems

JOURNALS ARTICLES

Yeongin Song¹, Hyunmin Kim¹, **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 Byun¹, 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 Byun¹, 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 Lee¹, **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 Lee¹, 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 Jang¹, 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 Kim¹, 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 Lee¹, Inkyu Jang¹, **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

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

Invited Presentations

- 2024.02 **Hybrid Controllers for Aerial Physical Interaction**, Inria centre at Rennes 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)