Jeonghyun Byun

PhD Student

Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul, Republic of Korea, 08826

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Education

Seoul National University *Seoul, Republic of Korea*

PhD Aerospace Engineering *2020.03.02 - 2025.02.26*

- GPA: 3.98 / 4.3
- Dissertation: Aerial physical interaction strategy considering changes in dynamics
- Advisor: H. Jin Kim

Seoul National University *Seoul, Republic of Korea*

BS Aerospace Engineering *2016.03.02 - 2020.02.26*

- GPA: 4.05 / 4.3
- Dissertation: Simulation of the object grabbing using a hexacopter with a 2-DOF robotic arm
- Advisor: H. Jin Kim

Outreach & Professional Development

Profession

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

Post-Doctoral Researcher *2025.03.01 -*

- Advisor: H. Jin Kim

Service and Outreach

Laboratory for Autonomous Robotics Research (LARR), Seoul National University *Seoul, Republic of Korea*

Laboratory Leader *2023.01.01 - 2023.12.31.*

Projects

Research and Education on Defense Intelligent Swarm System *South Korea*

Ministry of Science and ICT *2024.07.01 - 2029.12.31*

- proceed on control and planning of single and multiple unmanned aerial vehicles, **led the team of graduate students**

Autonomous Wheel Loader *South Korea*

Hyundai Construction Equipment (HCE) *2023.03.01 - 2026.03.01*

- trajectory generation strategy for V-shape maneuver of a wheel loader, **led the team of graduate students**

Hybrid Motion/Force Controller for Underactuated Aerial Manipulator *South Korea*

BrainKorea21PLUS *2021.12.01 - 2022.03.31*

- Design a transient performance-enhancing hybrid motion/force controller for an underactuated multirotor equipped with added equipment, **led the team of graduate students**

Friction Coefficient Estimation *South Korea*

Hyundai Motors *2021.06.01 - 2022.05.01*

- Physically estimate friction coefficient between car's tire and road

Multi-UAV Driving System *South Korea*

Korea Aerospace Industries (KAI) *2022.01.01 - 2022.02.01*

- Help trajectory-tracking experiment using a multirotor

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 **Incentive Award, Aerospace Paper Award**, Korea Aerospace Industries (**KAI**), LTD.

2020.02 **Top of the Class**, Department of Aerospace Engineering, Seoul National University

2020.02 **Summa Cum Laude**, Seoul National University

2018.09 **Honorable Mention, 7th SNU Creative Design Fair**, College of Engineering, Seoul National University

2017.09 **Honorable Mention, 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

Publications

Journals Articles

Jeonghyun Byun[1], 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[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**).

Manuscript Under Review / In Preparation

Jeonghyun Byun[1], Dongjae Lee, Dohyun Eom, H. Jin Kim. Stability-Guaranteed Motion/Force Control for Aerial Push-and-Slide with Experimental Validation.
In preparation (journal submission)

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.
In preparation (journal submission)

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)

Invited Presentations

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

Academic Services

- **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

Teaching Experience

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)

Reference

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