

Jeonghyun Byun

PHD STUDENT

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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

2025.03. Automation and Systems Research Institute (ASRI), SNU, Postdoctoral Researcher

South Korea

SERVICE AND OUTREACH

2023 Laboratory for Autonomous Robotics Research (LARR), Laboratory Leader

Projects

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**

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 multicopter

Autonomous Excavator

South Korea

HYUNDAI CONSTRUCTION EQUIPMENT (HCE)

2020.09.01 - 2021.01.01

- Design external wrench estimator for excavator path-planning

Publications

JOURNALS ARTICLES

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 Byun¹, 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 Byun¹, 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 Byun¹, 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 Byun¹, 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 Byun¹, Dongjae Lee, Dohyun Eom, H. Jin Kim. Motion/Force Control of an Aerial Manipulator with Stability Analysis Using Switched System Approach.
In preparation (journal submission)

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

Jeonghyun Byun¹, Yeonjun Kim, Dongjae Lee, H. Jin Kim. Safety-Critical Control for Aerial Physical Interaction in Uncertain Environment.
Under review (conference submission)

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

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)