

Jaewoo Kim

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RESEARCH INTERESTS

Design Optimization of Space Systems

- Mathematical modeling of various space systems
- System design considering the lifecycle, from inception to retirement
- Considering various stakeholders and deriving solutions from a holistic viewpoint
- Exploring potentials of emerging technologies

Decision-Making Under Uncertainties

- Defining real-world problems related to highly uncertain nature and identifying key factors
- Developing decision-making framework based on fundamentals of mathematical reasoning

EDUCATION

Korea Advanced Institute of Science & Technology (KAIST) 🇰🇷

Daejeon, Korea

Ph.D. in Aerospace Engineering

Feb. 2024 – Present

- Advisor: Prof. Jaemyung Ahn 🇰🇷

M.S. in Aerospace Engineering

Feb. 2022

- Thesis Title: Optimal Satellite System Architecting Considering On-Orbit Refueling (Advisor: Prof. Jaemyung Ahn 🇰🇷)

Seoul National University (SNU) 🇰🇷

Seoul, Korea

B.S. in Mechanical and Aerospace Engineering

Feb. 2022

- Thesis Title: Celestial Navigation Using Stars and Planets on Lunar Exploration Orbit (Advisor: Prof. Changdon Kee 🇰🇷)

RESEARCH EXPERIENCE

Strategic Aerospace Initiative, KAIST 🇰🇷 | *Research Assistance*

Feb. 2022 – Present

1. A Study on the Principle of Modular Architecture Engineering to Improve Level of Completion for Vehicle Architecture
 - Developed an integer programming approach to design structure matrix-based system modularization with various constraints [J2]
 - Performed several case studies of automobile subsystems and obtained improved design solutions
2. Research on ADR/OOS Applications for National Security Space Assets
 - Reviewed on-orbit servicing technologies and related projects [C2]
3. Development of Launch Vehicle Mission & Conceptual Design Software
 - Developed analysis tools for the propulsion module and the staging module
 - Contributed to developing all-at-once design optimization framework of launch vehicles [J3]
4. Optimal Satellite System Architecting Considering On-Orbit Servicing
 - Developed an optimal satellite system architecting framework based on a lifecycle simulation [J1][C1]

GNSS Laboratory, SNU 🇰🇷 | *Undergraduate Researcher*

Mar. 2021 – Aug. 2021

1. Deep Space Navigation with Optical Sensor Data
 - Reviewed some non-inertial deep space navigation algorithms
 - Analyzed the performance of the selected algorithm based on the basic linear algebra and Monte-Carlo simulation

PUBLICATIONS

Journal Articles

- [J1] **Kim, J.** and & Ahn, J. Optimal Satellite System Architecting Considering On-Orbit Refueling. In preparation (target journal: Journal of Spacecraft and Rockets).
- [J2] **Kim, J.**, Choi, E., & Ahn, J. A Mixed Binary Linear Programming Approach to Design Structure Matrix-Based System Modularization. In preparation (target journal: IEEE Transactions on Engineering Management).
- [J3] Ko, J., **Kim, J.**, Choi, J., & Ahn, J. (2023). Simultaneous Optimization of Launch Vehicle Stage and Trajectory Considering Operational Safety Constraints. *arXiv preprint arXiv:2307.12642*.

Conference Proceedings

- [C1] **Kim, J.**, & Ahn, J. Multiobjective Design Optimization of Commercial Satellite Considering On-Orbit Refueling Policy. In *2023 Proceedings of the Korean Society for Aeronautical and Space Sciences, Spring Conference*, Jeju, Korea.
- [C2] **Kim, J.**, Lee, D. U., & Ahn, J. Research on the Overseas On-Orbit Servicing Trends and Implications. In *2022 Proceedings of the Korean Society for Aeronautical and Space Sciences, Fall Conference*, Jeju, Korea.

AWARDS & HONORS

- Hanhwa-KAIST Space Hub Space Grand Challenge** | *Bronze* Nov. 2023
- Team Name: LETA (Lunar Exploration Trajectory Analytics)
 - Topic: Lunar exploration trajectory design with low-thrust propulsion and multiple gravity assist

EXTRACURRICULAR EXPERIENCES

- Part-Time Lecturer** | *Data Diving co.* Aug. 2022 – Present
- Provided lectures about basic concepts and programming tools for data science
 - Institutions: Korea Education & Research Information Service (KERIS), Statistics Korea (KOSTAT), Ewha Womans University, Sookmyung Women's University, Seoul Digital Foundation
- Military Service** | *Defense Security Command (DSC)* Apr. 2018 – Nov. 2019
- Supported educational programs in DSC
 - Squad leader
 - Commendation from Brigadier General
- Interviewer** | *Humans of SNU* Jul. 2017 – Dec. 2017
- Interviewed diverse members in SNU and discovered impactful stories from them
- President of SNU Chapter and Univ. Union** | *People to People International* Mar. 2016 – Feb. 2018
- Supported underprivileged members of the urban community and abandoned pets
 - Supported conferences for the promotion of international friendship

OTHER SKILLS

Programming

- Language: Python, MATLAB, Julia, C, C++
- Tools: Gurobi, pytorch, numpy, pandas, seaborn, matplotlib, pymoo

Language

- Korean (first), English (second, professional working proficiency)