TAEUK IM

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INTERESTS

AI-RAN, Reinforcement Learning, Stochastic & Online Optimization, Convex & Non-convex Optimization, Space Data Center

SKILLS

Technical: MATLAB, Python (computer programming), Python & libraries (Numpy, Matplotlib, Scikit-learn, Pandas, Pytorch, CVXPY), Basic skills on LaTeX, Machine learning, Deep Reinforcement Learning, Implementation of optimization methods

EDUCATION

Master's student: Aerospace Engineering *Sep 2025*
KAIST (Korea Advanced Institute of Science and Technology), Daejeon, South Korea *GPA 2.8/4.3*
- Advisor : Jihwan Choi ; ACAI Laboratory (Aerospace Communications & Applied Intelligence Lab, https://acai-kaist.github.io)

Bachelor of Science: Astronomy *Mar 2023 - Aug 2025*
Yonsei University, Seoul, South Korea *GPA 3.88/4.3*
- HIGH HONORS, 1ST SEMESTER, 2024 ; HONORS, 2ND SEMESTER, 2023

Undergraduate studies: Electrical Engineering *Mar 2018 - Dec 2020*
Sejong University, Seoul, South Korea *GPA 4.38/4.5*

AWARDS & HONORS

Government-sponsored scholarship *Sep 2025*
KAIST
- Government-sponsored scholarship recipient during the Master's degree programme at KAIST

Full Scholarship *Sep 2024*
Yonsei University
- Granted full scholarship for the semester in recognition of outstanding academic performance

Commendation Award (Certificate of Appreciation) *Oct 2022*
Jongno Police Station, Seoul, Korea
- Awarded in recognition of diligent and sincere performance of assigned military duties and for making a meaningful contribution to the advancement of police administration, commemorating the 77th Anniversary of the Korean National Police.

Full Scholarship *Mar 2020*
Sejong University
- Granted a full scholarship for the semester in recognition of first-rank academic performance

Full Scholarship *Mar 2019*
Sejong University
- Granted a full scholarship for the semester in recognition of first-rank academic performance

CONFERENCES/PRESENTATIONS

Multi-Shell Space Data Centers in the Sun-Synchronous Orbit-assisted LEO Mega-Constellation *Feb 2026*
Korean Institute of Information and Communications (KICS) Winter Conference 2026, YONGPYONG, Pyeongchang, Korea

RESEARCH EXPERIENCE

Full-Time Master's Researcher *Sep 2025 - Present*
KAIST, Daejeon, Korea
- Assisted in background research by reviewing relevant academic papers and patents for the preparation of a government-funded basic research project proposal.
- Conducted a literature review on computation offloading in Space-Air-Ground Integrated Network (SAGIN), focusing on architectures, optimization methods, and DRL approaches.
- Proposed a multi-shell space data center architecture in an Sun Synchronous Orbit (SSO)-assisted LEO mega-constellation and have been conducting follow-up research on joint energy–latency optimization of toy problems using PPO and KKT-based approaches.

Undergraduate Research Assistant *Jul 2024 - May 2025*
Yonsei University, Seoul, Korea
- Implemented numerical root-finding and equation-solving algorithms, including Bisection, Secant, and Newton–Raphson methods for scalar and vector roots, with error analysis using L1, L2, and L-infinite norms; proficient in MATLAB built-in solvers such as fzero and fsolve.
- Developed numerical differentiation, integration solvers, and used ODE solvers, implementing Euler and Runge–Kutta methods, and utilizing ODE45 (Dormand–Prince with adaptive step size) to solve initial value problems and validate numerical accuracy.
- Applied numerical methods to orbital mechanics problems, including solving Kepler's equation, two-body dynamics, and J2 perturbation analysis; designed and verified Sun-synchronous and Molniya orbits, and analyzed error trends and secular/periodic behaviors of orbital elements.

Undergraduate Research Assistant (Advisor : Jae Kyu Suhr) *Sep 2019 - Feb 2020*
Sejong University, Seoul, Korea
- Studied fundamentals of digital image processing, including edges, gradients, filters and transforms
- Learned core concepts of computer vision, including least squares, RANSAC and Viola-Jones object detection
- Studied basics of deep neural networks (DNNs), including CNN-based image classification and YOLO-based object detection

WORK EXPERIENCE

Teaching Assistant *Mar 2026 - Jun 2026*
KAIST, Daejeon, Korea *(Expected)*
- Teaching Assistant, Reading Great Books on Human Intelligence and Civilization: Universe

Teaching Assistant
Korea University (KU) camp
- Taught students in drone assembly and flight practice, Arduino practice, and coding exercises (Summer, 2025)

Teaching Assistant
Korea Astronomy Olympiad (KAO)
- Summer 2023; Summer 2024; Winter 2024
- Instructed Astronomy Olympiad problems and supervised telescope observation

Social Service Agent (Military Duty) *Jan 2021 - Oct 2022*
Jongno Police Station
- Provided civil complaint consultation services, handling citizen requests under high-pressure conditions
- Awarded a Certificate of Commendation for outstanding public service performance

PROJECTS

Literature Review on Computation Offloading in SAGIN: Architecture, Optimization, and DRL Approaches *Sep 2025*
- Analyzed SAGIN architectures and optimization problems across multiple studies
- Examined optimization formulations including task offloading, association control, resource allocation, and trajectory design
- Studied Lyapunov optimization for problem reformulation, MINLP solution methods (e.g., GBD and SCA with KKT-based convex subproblems), and DRL-based approaches (e.g., DDPG, DQN)

Computational Astronomy (Implemented the algorithm using Python) *Mar 2024 - Jun 2024*
- One-semester course project for "Computational Astronomy"
- Interpolation Methods : Linear interpolation, polynomial interpolation, cubic spline interpolation
- Optimization : χ^2 minimization and line minimization, Downhill Simplex (Amoeba) and Powell methods, Gauss–Newton and Levenberg–Marquardt algorithms
- Solver for differential Equations : Euler, Midpoint (Leapfrog), 4th-order Runge–Kutta
- Root-Finding Algorithms : Bisection, Secant, False-Position, Newton–Raphson methods, nonlinear system solving using Broyden's method

Analysis of the correlation between the number of bicycle users and meteorological factors *Mar 2024 - Jun 2024*
- One-semester course project for "Big Data For Atmospheric Science"
- Demonstrated that higher temperature and insolation are positively correlated with bicycle usage, while higher precipitation is negatively correlated
- Analyzed raw daily Automated Synoptic Observing System (ASOS) meteorological data and Seoul public bicycle usage data from 2020–2023
- Performed optimization using RandomForestRegressor and GradientBoostingRegressor, and compared their performance using pandas and scikit-learn

Image Classification of Santa and Hulk using CNNs *Sep 2023 - Dec 2023*
- One-semester course project for "SW Programming"
- Collected Santa and Hulk images and applied rotation-based data augmentation
- Included visually confusing samples (e.g., green Santa, red Hulk)
- Compared a custom CNN model with ResNet-50–based transfer learning

Reusable Space Vehicle Designing *Sep 2024 - Dec 2024*
- One-semester course project for "Introduction To Spacecraft Design"
- Led the GNC (Guidance, Navigation & Control) subsystem, by designing and simulating an orbit that simultaneously satisfies sun-synchronous and ground-repeat conditions using GMAT and MATLAB
- Designed operational orbit (LEO), transfer orbit, and reentry phases to enable mission execution and safe return to Earth

CANSAT COMPETITION KOREA (2024) *Jan 2024*
- Team Lead; Communications and Electrical Power Subsystem (COMS & EPS) Lead
- Converted CanSat coordinates from the SEZ frame to the ECI frame using sensor data
- Estimated solar azimuth and elevation via image detection
- Estimated the distance between the Sun and the CanSat by acquired data

Analysis of comparision between LZW algorithm and Huffman code *Sep 2019 - Dec 2019*
- Final project for "Information Theory"
- Compared LZW compression and Huffman coding by analyzing their practical performance and limitations

TEST SCORES

TOEFL *Dec 2025*
ETS (Educational Testing Service), United States of America *Score 96/120*
- Reading: 24 ; Listening: 29 ; Speaking: 20 ; Writing: 23

VOLUNTEER WORK

Volunteer Teaching and Educational Mentoring,
- Over 250 hours of volunteer service
- Teaching mathematics to seniors at St. Ignatius Sogang University, a Korean GED night school (2025–present)
- Silver Lining, KAIST International Volunteer Club (Fall 2025–present)
- Taught mathematics to seniors at Sarangbang, a Korean GED night school (2021–2022)
- Provided mentoring, counseling, and mathematics instruction to a high school senior at an education welfare center (2021)

HOBBIES

KAIST Table Tennis Club (Fall 2025–), Yonsei University College of Science Basketball Team (Spring 2025–),
Yonsei University Kendo Team (2023–Spring 2025) ; Freshman Competition Winner, Sejong University Basketball Team (2018-2020)

EXTRA CURRICULAR ACTIVITIES

Public Astronomy Lecture *Jan 2024 - Present*

Yonsei University, SEOUL

- Delivered a public astronomy lecture for a general audience
- Organized an astronomical observation session

Speaking Society Club *Mar 2019 - Dec 2023*

Speaking Society Club (SSC), Hanyang University, Seoul

- Vice President, managed international members
- English conversation & debate club