Juhwan Lee

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RESEARCH INTERESTS

Data-Driven Modeling and Decision Support for Air Transportation Systems

- Airport Operations: Capacity analysis, delay prediction, and operational performance evaluation
- Air Traffic Management: Aircraft trajectory analysis, taxi time prediction, and flight efficiency assessment
- Aviation Safety: Uncertainty modeling, probabilistic collision risk analysis, and latent risk detection
- Passenger Flow Management: Passenger flow modeling, queue forecasting, and congestion analysis
- Simulation and Decision Support: Airport simulation, scenario analysis, and data-driven operational planning

EDUCATION

Korea Aerospace University *Sep 2023 – Present*
Ph.D. Student in Air Transportation *Goyang, South Korea*

Advisor: Dr. Hojong Baik
GPA: 4.0/4.0 (4.35/4.5)
Research focus: Airport operations, capacity analysis, airport simulation, and data-driven forecasting
Key courses: Airport Planning, Transportation Planning, Deep Reinforcement Learning, Special Aviation Weather Reports, Advanced Neural Networks, Machine Learning with Python, Optimization Theory and Applications

Korea Aerospace University *Aug 2023*
M.S. in Air Transportation *Goyang, South Korea*

Advisor: Dr. Hojong Baik
GPA: 4.0/4.0 (4.5/4.5)
Key courses: Introductory Applied Machine Learning, Airport Design with Simulation, Advanced Discrete Choice Theory in Transportation, Theory and Application of Data Mining, Airlines Operations Control

Korea Aerospace University *Aug 2021*
B.S. in Air Transportation *Goyang, South Korea*

GPA: 3.77/4.0 (4.05/4.5) · *Magna Cum Laude*
Key courses: Air Traffic Management, Airspace System Analysis, Air Transportation System Analysis, Aviation Weather Service, Flight Operation Planning & Control, Computer Applications for Air Transportation Studies, Airport Operations

WORK EXPERIENCE

Research Intern *Jan 2025 - Feb 2025*
Incheon International Airport Corporation, Airport Research Institute *Incheon, South Korea*

- Analyzed airport operations and traffic patterns under peak and non-peak periods.
- Developed data-driven models for terminal-congestion forecasting and aircraft variable taxi times (VTT) prediction using operational data from Incheon International Airport.

Graduate Research Assistant *Sep 2021 - Present*
Air Transportation Simulation and Optimization Lab, Korea Aerospace University *Goyang, South Korea*

- Conducted simulation-based assessments of airport capacity, operational efficiency, and safety.
- Evaluated airport development and expansion scenarios in terms of delays, safety, and economic feasibility.
- Analyzed aircraft trajectories to identify Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) and assess fuel efficiency.

Undergraduate Research Assistant *Jul 2019 - Sep 2019*
Air Transportation Modeling and Control Lab, Korea Aerospace University *Goyang, South Korea*

- Analyzed airline fleet data to characterize fleet composition and operational patterns.
- Reviewed international Air Traffic Flow Management (ATFM) practices to inform potential implementation in South Korea.

PROJECT EXPERIENCE

Airport Integrated Information System Enhancement *Sep 2025 - Mar 2026*
Incheon International Airport Corporation *Incheon, South Korea*

- Analyzed flight schedules, passenger flows, queue lengths, and waiting times to characterize airport operational performance.
- Developed and validated a CAST-based passenger terminal simulation model to support operational planning.

Strategic Planning for Airport Hub Competitiveness *Oct 2025 - Dec 2025*
Incheon International Airport Corporation *Incheon, South Korea*

- Assessed airport delays under varying passenger demand and capacity conditions.
- Evaluated operational performance to support strategic airport planning and competitiveness analysis.

Passenger Terminal Simulation Model Development *Jul 2025 - Dec 2025*
Incheon International Airport Corporation *Incheon, South Korea*

- Developed MATLAB-based simulation models of airport departure processing facilities using operational data.
- Quantified queue lengths and waiting times under varying passenger demand and processing capacity.

Apron Congestion Mitigation through Variable Multiple Taxiway Operations *Jul 2025 - Dec 2025*
Korea Airports Corporation *Seoul, South Korea*

- Modeled aircraft ground movements and apron congestion using TAAM simulation.
- Evaluated alternative taxi-line configurations to assess congestion mitigation and surface operational efficiency.

Master Plan for Incheon International Airport *Sep 2022 - Aug 2024*
Incheon International Airport Corporation *Incheon, South Korea*

- Estimated runway and passenger terminal capacity using TAAM and CAST simulation models.
- Evaluated airport expansion scenarios in terms of capacity, congestion, delays, and economic feasibility.

Performance-Based Navigation Flight Procedure Maintenance and Evaluation *Sep 2021 - Dec 2021*
Ministry of Land, Infrastructure and Transport *Sejong, South Korea*

- Analyzed historical aircraft trajectories to identify CDO and CCO.
- Evaluated the fuel efficiency of identified CDO and CCO flight operations.

PUBLICATIONS

[1] **Juhwan Lee**, S. Yoon, K. Lee, H. Baik, and S. Jeong, "Airport Passenger Queue Forecasting for Departure Gates and Security Checkpoints," IEEE/AIAA 45th Digital Avionics Systems Conference (DASC), 2026. **Best Paper of Session Award, Top 10 Best Student Paper Finalist**

[2] Y. Cho, J. Ahn, H. Baik, and **Juhwan Lee**, "Analysis of Aircraft De-icing/Anti-icing Efficiency Considering Pad Allocation and Ground Handling Operations," Journal of the Korean Society for Aviation and Aeronautics, 2026.

[3] J. Shin, H. Baik, **Juhwan Lee**, and B. Yi, "Network Connectivity Analysis of Major Asian Airports Using the NetScan Model: Focusing on Incheon International Airport," Journal of the Korean Society for Aviation and Aeronautics, 2025.

[4] J. Shin, B. Yi, M. Kim, J. Cho, and **Juhwan Lee**, "Study on Airport Capacity Utilization Analysis Using the Capacity Coverage Chart (CCC)," Journal of the Korean Society for Aviation and Aeronautics, 2025.

[5] E. Kim, **Juhwan Lee**, Y. Shin, and H. Baik, "A Study on Airport Access Mode Choice Behavior Using Mobile Data: Case of Incheon International Airport," IEEE/AIAA 42nd Digital Avionics Systems Conference (DASC), 2023.

[6] C. Lee, **Juhwan Lee**, J. Park, and H. Baik, "An Analysis on the Utilization of STAR (Standard Terminal Arrival Route) and CDO (Continuous Descent Operation) Flight Ratio in the Domestic Airport," Journal of the Korean Society for Aviation and Aeronautics, 2022.

[7] Y. Lee, **Juhwan Lee**, and K. Lee, "A Study on the Visualization of an Airline's Fleet State Variation," Journal of the Korean Society for Aviation and Aeronautics, 2021.

AWARDS AND ACHIEVEMENTS

Best Paper of Session Award, AIAA DATC/IEEE Digital Avionics Systems Conference		*Fall 2026*
Academic Merit Scholarship, Korea Aerospace University	$4,520	*Fall 2021*
2nd Place in Capstone Design Competition	$260	*Fall 2020*
2nd Place in ICT Startup Makerthon	$740	*Fall 2019*
Academic Merit Scholarship, Korea Aerospace University	$841	*Fall 2019*
Academic Merit Scholarship, Korea Aerospace University	$739	*Fall 2016*

TECHNICAL SKILLS

Programming	Python, MATLAB, LaTeX
Frameworks	PyTorch, NumPy
Simulation Tools	TAAM (Total Airspace and Airport Modeller), CAST (Passenger terminal simulation)

REFERENCES

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Korea Aerospace University, Goyang, South Korea
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