

Hyeonsu Lyu

POSTDOCTORAL RESEARCHER · WIRELESS COMMUNICATIONS · ARTIFICIAL INTELLIGENCE · ROBOTICS

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“Connected intelligence for reliable mobile robotic systems”

Education

Pohang University of Science and Technology (POSTECH)

DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING

Advised by Dr. Hyun Jong Yang.

Pohang, Korea

Mar. 2021 –Feb. 2026

Ulsan National Institute of Science & Technology (UNIST)

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

Ulsan, Korea

Mar. 2018 –Feb. 2021

Ulsan National Institute of Science & Technology (UNIST)

BACHELOR OF SCIENCE IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

Ulsan, Korea

Mar. 2014 –Feb. 2018

Experience

Seoul National University, AiSLab

POSTDOCTORAL RESEARCHER

Seoul, Korea

Mar. 2026 –Mar. 2027

University of Texas at Austin

VISITING SCHOLAR

Austin, Texas

Aug. 2025 –Feb. 2026

Publications

INTERNATIONAL JOURNALS

1. Jonggyu Jang, **Hyeonsu Lyu**, David J. Love, and Hyun Jong Yang, “Joint Optimization of User Association and Resource Allocation for Load Balancing With Multi-Level Fairness,” *IEEE TCOM*, 2026. Accepted.
2. Hyeonho Noh, **Hyeonsu Lyu**, Moe Z. Win, and Hyun Jong Yang, “DCFNet: Doppler Correction Filter Network for Integrated Sensing and Communication in Multi-User MIMO-OFDM Systems,” *IEEE TWC*, 2026.
3. Jonggyu Jang, **Hyeonsu Lyu**, Seongjin Hwang, and Hyun Jong Yang, “Unveiling Hidden Visual Information: A Reconstruction Attack Against Adversarial Visual Information Hiding,” *IEEE TNNLS*, 2025.
4. **Hyeonsu Lyu**, Jonggyu Jang, Harim Lee, and Hyun Jong Yang, “Non-Iterative Optimization of Trajectory and Radio Resource for Aerial Network,” *IEEE TWC*, 2025. Best Paper Award; US Patent.
5. Hyeonho Noh, **Hyeonsu Lyu**, and Hyun Jong Yang, “Multiple Active STAR-RIS-Assisted Secure Integrated Sensing and Communication via Cooperative Beamforming,” *IEEE IoTJ*, 2026.
6. Harim Lee, Myeung Un Kim, Yeongjun Kim, **Hyeonsu Lyu**, and Hyun Jong Yang, “Development of a Privacy-Preserving UAV System With Deep Learning-Based Face Anonymization,” *IEEE Access*, 2021.
7. Hyun Jong Yang, Moohyun Oh, Jonggyu Jang, **Hyeonsu Lyu**, and Junhee Lee, “Robust Deep-learning Based Autofocus Score Prediction for Scanning Electron Microscope,” *MMA*, 2020.

INTERNATIONAL CONFERENCES AND WORKSHOPS

1. **Hyeonsu Lyu**, Yumin Kim, and Hyun Jong Yang, “On the Secure Connection Probability of Multi-Hop Relaying in Multi-Layer Networks,” *IEEE ICTC*, 2025. Best Paper Award.
2. Jungyeon Koh, **Hyeonsu Lyu**, Jonggyu Jang, and Hyun Jong Yang, “Faithful and Fast Influence Function via Advanced Sampling,” *ICMLW*, 2024.
3. Yumin Kim, **Hyeonsu Lyu**, Minjae Lee, and Hyun Jong Yang, “Accuracy-Delay Trade-Off in LLM Offloading via Token-Level Uncertainty,” *GLOBECOMW*, 2025.

4. Jonggyu Jang, **Hyeonsu Lyu**, Hyun Jong Yang, Moohyun Oh, and Junhee Lee, “Deep Learning-Based Autonomous Scanning Electron Microscope,” *IEEE IROS*, 2020. Demo and press release.
5. **Hyeonsu Lyu** and Hyun Jong Yang, “Maneuver by Airstreams for Stratospheric Balloon Base Stations,” *IEEE ICTC*, 2023.
6. **Hyeonsu Lyu**, SeongJin Hwang, and Hyun Jong Yang, “Multi-Agent Reinforcement Learning-Based Coverage Maximization for Fixed-Wing Base Stations,” *IEEE ICTC*, 2022.

PREPRINTS

1. **Hyeonsu Lyu**, Minwoo Kim, Sojeong Park, and Hyun Jong Yang, “SceneBaker: Radio-Ready Scene Generation for Sionna Ray-Tracing,” *arXiv*, 2026.
2. **Hyeonsu Lyu**, Hyeonho Noh, Hyun Jong Yang, and Kaushik Chowdhury, “Secure Multi-Hop Relaying in Large-Scale Space-Air-Ground-Sea Integrated Networks,” *arXiv*, 2025. Submitted to IEEE Internet of Things Journal; Best Paper Award.
3. **Hyeonsu Lyu**, Yumin Kim, and Hyun Jong Yang, “End-to-End Secure Connection Probability in MultiLayer Networks with Heterogeneous Rician Fading,” *arXiv*, 2026. Submitted to IEEE Transactions on Vehicular Technology.
4. **Hyeonsu Lyu**, Jonggyu Jang, Sehyun Ryu, and Hyun Jong Yang, “Deeper Understanding of Black-box Predictions via Generalized Influence Functions,” *arXiv*, 2024. Under review; Competition Award.
5. Jonggyu Jang, **Hyeonsu Lyu**, David J. Love, and Hyun Jong Yang, “Fed-ZOE: Communication-Efficient Over-the-Air Federated Learning via Zeroth-Order Estimation,” *arXiv*, 2024. Submitted to IEEE Journal on Selected Areas in Communications.
6. Jonggyu Jang, **Hyeonsu Lyu**, Jungyeon Koh, and Hyun Jong Yang, “Replace-then-Perturb: Targeted Adversarial Attacks With Visual Reasoning for Vision-Language Models,” *arXiv*, 2024. Submitted to IEEE Transactions on Multimedia.

Domestic Papers

1. Hyeonho Noh, **Hyeonsu Lyu**, and Hyun Jong Yang, “Deep Learning-Based Interference Cancellation for OFDM ISAC,” *Proc. 36th Joint Conf. Commun. Inf.*, April 2026.
2. **Hyeonsu Lyu**, Minwoo Kim, Sehyun Ryu, and Hyun Jong Yang, “Towards Building a Ray-Tracing-Compatible Digital Twin Scene for Wireless-Aware Physical AI Systems,” *Proc. 36th Joint Conf. Commun. Inf.*, April 2026.
3. **Hyeonsu Lyu**, Hyeonho Noh, and Hyun Jong Yang, “Secure Radio Resource and Routing Optimization in Multi-Hop Space-Air-Ground-Sea Integrated Networks,” *Proc. KICS Summer Conf.*, June 2025.
4. **Hyeonsu Lyu** and Hyun Jong Yang, “On the Non-Iterative Optimization for Aerial Communications,” *Proc. KICS Summer Conf.*, June 2024.
5. **Hyeonsu Lyu** and Hyun Jong Yang, “A Survey on High-Altitude Balloon UAVs for Vertical Heterogeneous Networks,” *J. Korean Inst. Commun. Inf. Sci.*, 2024.
6. **Hyeonsu Lyu** and Hyun Jong Yang, “Stratolite: Breakthrough for UAV Communications,” *Proc. KICS Summer Conf.*, June 2023. Best Paper Award.
7. **Hyeonsu Lyu** and Hyun Jong Yang, “Machine Unlearning: A Survey on Principles and Challenges,” *Proc. KICS Winter Conf.*, February 2023.
8. **Hyeonsu Lyu**, Jonggyu Jang, and Hyun Jong Yang, “Generalized Water-Filling Algorithm for Fast User Association and Resource Allocation,” *Proc. KICS Fall Conf.*, November 2022.
9. **Hyeonsu Lyu**, Jonggyu Jang, Harim Lee, and Hyun Jong Yang, “Trajectory-Planning and Resource Allocation of UAV Base Station with User QoS Constraints,” *Proc. KICS Summer Conf.*, June 2022.
10. Sojeong Park, **Hyeonsu Lyu**, and Hyun Jong Yang, “Designing Scalable Deep Q-Learning Using Fully Convolutional Network,” *Proc. KICS Winter Conf.*, February 2022.
11. **Hyeonsu Lyu**, Harim Lee, Yeongjun Kim, and Hyun Jong Yang, “A Study on the Optimal Drone Hardware Component Selection Algorithm Maximizing Flight Time,” *Proc. KICS Summer Conf.*, June 2021.
12. **Hyeonsu Lyu** and Hyun Jong Yang, “A Study on Establishing Testbeds for Reinforcement Learning of Unmanned Aerial Vehicles,” *Proc. KICS Winter Conf.*, February 2021.

1. **Hyeonsu Lyu** and Hyun Jong Yang, “Method and Device for Converting 3D Scenes,” KR 10-2026-0156534. Filed.
2. Jonggyu Jang, **Hyeonsu Lyu**, and Hyun Jong Yang, “Apparatus and Method for Determining Whether There Is a Possibility of Personal Information Leakage by Generating a Restored Image Set Corresponding to the Training Dataset of an Artificial Intelligence Model,” KR 10-2024-0161882. Filed.
3. Jonggyu Jang, **Hyeonsu Lyu**, Seong Jin Hwang, and Hyun Jong Yang, “Apparatus and Method for Generating a Key Model for Restoring Encrypted Images to Protect Personal Information in a Cloud-Based Image Recognition Service,” KR 10-2024-0163065. Filed.
4. Jungyeon Koh, **Hyeonsu Lyu**, Jonggyu Jang, and Hyun Jong Yang, “Apparatus and Method for Unlearning an Artificial Intelligence Model,” KR 10-2024-0134631. Filed.
5. **Hyeonsu Lyu**, Jonggyu Jang, Sehyeon Ryu, and Hyun Jong Yang, “Electronic Device for Deriving Influence Function,” KR 10-2024-0045157. Filed.
6. Myoung Hoon Lee, Jun Moon, Hyun Jong Yang, and **Hyeonsu Lyu**, “Autonomous Flight UAV and Method Controlling Thereof,” KR 10-2021-0185112; Registration 10-2684376. Filed and registered.
7. **Hyeonsu Lyu**, Hyun Jong Yang, and Jonggyu Jang, “Tree-Search Based Trajectory Planning and Resource Management Method and Apparatus of Unmanned Aerial Vehicle Base Station,” US 18/319,369. Filed.
8. **Hyeonsu Lyu**, Hyun Jong Yang, and Jonggyu Jang, “Tree-Search Based Trajectory Planning and Resource Management Method and Apparatus of Unmanned Aerial Vehicle Base Station,” KR 10-2022-0186323; Registration 10-2817343. Filed and registered.
9. **Hyeonsu Lyu**, SeongJin Hwang, and Hyun Jong Yang, “Multi-Agent Reinforcement Learning-Based Coverage Maximization Method for Fixed-Wing Base Stations,” KR 10-2022-0175220. Filed.
10. **Hyeonsu Lyu**, Hyun Jong Yang, and Jonggyu Jang, “Generalized Fast Water-Filling Algorithm for User Association and Resource Allocation,” KR 10-2022-0172711. Filed.
11. Hyun Jong Yang, Harim Lee, and **Hyeonsu Lyu**, “Method and Apparatus for Downlink Communication of an eNB Using an Asymmetric Hidden AP in LTE-LAA and Wi-Fi Coexistence,” KR 10-2019-0159620; Registration 10-2240690. Filed and registered.

Key Research Projects

Development of AI-Native 6G Systems Orchestrating AI-Native Services

MSIT, IITP, RS-2024-00398157

2024–2028

Research on scalable learning-based multi-UAV BS communication technologies for practical multi-UAV BS systems

MSIT, NRF, RS-2023-00240191

2023–2026

Research on Ultra Reliable Aerial Network framework Supporting High-density Urban Air Mobility

MSIT, IITP, 2021-0-02048

2021–2028

Development of Joint Electrical/Mechanical Drone Beamforming based on Target Detection and Precise Attitude Control

MSIT, IITP, 2018-0-00958

2018–2022

AI-RAN Global Flagship Project

MSIT, IITP, RS-2026-25525793

2026–2030

Development of Adaptive RAN/RIC Application Performance Guarantee

MSIT, IITP, RS-2026-25523626

2026–2028

6G Cloud Research and Education Open Hub

MSIT, IITP, RS-2024-00428780

2024–2028

Development of 5G-A vRAN Research Platform

MSIT, IITP, RS-2024-00404972

2024–2028

Development of Artificial Intelligence Scanning Electron Microscope

MOTIE, 20005526

2019–2020

Awards & Honors

- 2026 **The 32nd Humantech Paper Awards**, Samsung
- 2025 **Best Paper Award**, IEEE International Conference on ICT Convergence
- 2025 **International Collaboration Support Program**, IITP–6G-Cloud Research and Education Open Hub
- 2025 **Overseas Dispatch Support Program**, POSTECH
- 2025 **Pre-Ph.D. Research Support Program**, KICS
- 2024 **Grand Prize in Patent Competition**, POSTECH and KIPA
- 2023 **KICS Best Paper Award**, KICS
- 2022 **Korea Aerospace Industries Paper Award**, KAI
- 2022 **Bae & Jung Scholarship**, Bae & Jung Foundation
- 2015 **National Supercomputing Competition, Second Award**, KISTI

Academic Services

REVIEWER

- 2025 IEEE Journal on Selected Areas in Communications
- 2025 IEEE Transactions on Wireless Communications
- 2026 IEEE Transactions on Network Science and Engineering
- 2026 IEEE Transactions on Communications
- 2026 IEEE Transactions on Vehicular Technology
- 2024–2026 IEEE Internet of Things Journal
- 2025 IEEE/ACM Transactions on Networking
- 2023–2026 IEEE Wireless Communications Letters
- 2023–2024 IEEE Consumer Communications & Networking Conference
- 2026 Journal of Communications and Networks
- 2022–2023 KICS Journal

OPEN SOURCE AND LOCALIZATION

- 2018–2021 QGroundControl Localization, 2nd highest contributor
- 2018–2021 PX4 User Guide Localization

Talks

- 1. ‘The Role of Aerial Networks in 6G Wireless’—KICS Summer Conference, June 2025