

Sanghoon Lee

Cyber-Physical AI Researcher

Ph.D. Candidate, CSI Lab, EECS, DGIST

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Research Interests

Physical AI, Robot Operating System 2 (ROS 2), Data Distribution Service (DDS),
Reinforcement Learning, Machine Learning, Mobile Robots

Education

DGIST (Daegu Gyeongbuk Institute of Science and Technology)

Combined UG-Graduate Program, Electrical Engineering & Computer Science 2022.3 -
2026.2

Major GPA: 4.3/4.3

University of California, Los Angeles (UCLA)

International Student Programs 2019.6 - 2019.9

Major GPA: 4.3/4.3

DGIST (Daegu Gyeongbuk Institute of Science and Technology)

B.S., Computer Science 2018.3 - 2022.2

Major GPA: 3.99/4.3

Research Experience

Undergraduate Research Student, CSI Lab

2020.9 - 2022.3

Summer Internship, CSI Lab, DGIST

2020.8 - 2020.9

Winter Internship, CAS Lab, DGIST

2020.1 - 2020.2

International Publications

- [23] Hyunho Ryu*, **Sanghoon Lee***, Minchan Kwak, and Kyung-Joon Park, "A Cross-Layer Attack on ROS 2: From DDS Discovery Vulnerabilities to ARP Spoofing," Under Review.
- [22] Jiyeong Chae, Hyunkyo Seo, **Sanghoon Lee**, and Kyung-Joon Park, "Time-Aware Costmap for Smoother and Less Disruptive AMR Navigation," Major Revision.
- [21] Hyunho Ryu, **Sanghoon Lee**, and Kyung-Joon Park, "Vulnerability Analysis of Cross-Layer Attacks on ROS 2," *2025 16th International Conference on Information and Communication Technology Convergence (ICTC)*, Oct. 2025.
- [20] **Sanghoon Lee**, Junha Kang, and Kyung-Joon Park, "Dependency Chain Analysis of ROS 2 DDS QoS Policies: From Life-Cycle Tutorial to Static Verification," *ArXiv*, Preprinted, Sep. 2025.
- [19] **Sanghoon Lee**, Taehun Kim, and Kyung-Joon Park, "Optimizing ROS 2 Communication for Wireless Robotic Systems," *ArXiv*, Preprinted, Aug. 2025.
- [18] **Sanghoon Lee**, Hyung-Seok Park, Jiyeong Chae, and Kyung-Joon Park, "Probabilistic Latency Analysis of the Data Distribution Service in ROS 2," *ArXiv*, Preprinted, Aug. 2025.
- [17] Hyunho Ryu, **Sanghoon Lee**, and Kyung-Joon Park, "Vulnerability Analysis of Cross-Layer Attacks on ROS 2," *International Conference on Information and Communication Technology Convergence (ICTC 2025)*, Oct. 2025.
- [16] **Sanghoon Lee**, Taehun Kim, Jiyeong Chae, and Kyung-Joon Park, "Poster: How to Send Large Data in ROS 2," *International Conference on Network Protocols (ICNP 2025)*, Sep. 2025.
- [15] Sangjun Kim, **Sanghoon Lee**, and Kyung-Joon Park, "DIDoS: Disturbance-Induced Denial-of-Service Attack in Cyber-Physical Systems," *International Journal of Control, Automation, and Systems (IJCAS)*, Accepted, Sep. 2025.
- [14] Jiyeong Chae*, **Sanghoon Lee***, Hyunkyo Seo, and Kyung-Joon Park, "From Issues to Routes: A Cooperative Costmap with Lifelong Learning for Multi-AMR Navigation," *Journal of Industrial and Intelligent Information (JIII)*, Sep. 2025.
- [13] **Sanghoon Lee**, Jiyeong Chae, and Kyung-Joon Park, "Integrating ROS 2 and Physical AI: Architecture and Challenges," *The 16th International Conference on Ubiquitous and Future Networks (ICUFN25)*, July 2025.
- [12] Hyung-Seok Park, **Sanghoon Lee**, and Kyung-Joon Park, "An Analytical Latency Model of the Data Distribution Service in ROS 2," *IEEE International Conference on Computer Communications (INFOCOM25)*, May 2025.
- [11] Jiyeong Chae, Hyunkyo Seo, **Sanghoon Lee**, and Kyung-Joon Park, "PINMAP: A Cost-efficient Algorithm for Glass Detection and Mapping Using Low-cost 2D LiDAR," *IEEE Transactions on Instrumentation and Measurement*, May 2025.
- [10] **Sanghoon Lee**, Jiyeong Chae, and Kyung-Joon Park, "Cyber-Physical Artificial Intelligence: Systematic Research Domain for Integrating Artificial Intelligence and Cyber-Physical Systems," *ACM Transactions on Cyber-Physical Systems*, Feb. 2025.
- [9] Tae-Woo Kim, **Sanghoon Lee**, Dong-Hyung Lee, and Kyung-Joon Park, "Priority-Driven Resource Allocation with Reuse for Platooning in 5G Vehicular Networks," *Sustainability*, Feb. 2025.
- [8] Sihoon Moon, **Sanghoon Lee**, and Kyung-Joon Park, "Learning-enabled Flexible Job-Shop Scheduling for Scalable Smart Manufacturing," *Journal of Manufacturing Systems*, Sep. 2024.
- [7] **Sanghoon Lee***, Jiyeong Chae*, Sihoon Moon, and Kyung-Joon Park, "False Alarm Prevention through Domain Knowledge-driven Machine Learning: Leakage Detection in Water Distribution

Networks," *IEEE Sensors Journal*, Aug. 2024.

[6] Sihoon Moon, **Sanghoon Lee**, Wonhong Jeon, and Kyung-Joon Park, "Learning-Enabled Network-Control Co-design for Energy-Efficient Industrial Internet of Things," *IEEE Transactions on Network and Service Management*, Apr. 2024.

[5] **Sanghoon Lee**, Jinyoung Kim, Gwangjin Wi, Yuchang Won, Yongsoon Eun, and Kyung-Joon Park, "Deep Reinforcement Learning-driven Scheduling in Multijob Serial Lines: A Case Study in Automotive Parts Assembly," *IEEE Transactions on Industrial Informatics*, Feb. 2024.

[4] Jiyeong Chae*, **Sanghoon Lee***, Junhyung Jang, Seohyung Hong, and Kyung-Joon Park, "A Survey and Perspective on Industrial Cyber-Physical Systems (ICPS): From ICPS to AI-Augmented ICPS," *IEEE Transactions on Industrial Cyber-Physical Systems*, Oct. 2023.

[3] Sihoon Moon, **Sanghoon Lee**, and Kyung-Joon Park, "Graph-based Reinforcement Learning for Flexible Job Shop Scheduling with Transportation Constraints," *49th Annual Conference of the IEEE Industrial Electronics Society (IECON23)*, Oct. 2023.

[2] Sangjun Kim, **Sanghoon Lee**, and Kyung-Joon Park, "Real-Time Controller Reconfiguration for Delay-Resilient Cyber-Physical Systems," *IEEE Access*, Oct. 2022.

[1] Sangjun Kim, **Sanghoon Lee**, and Kyung-Joon Park, "Resilient Controller Reconfiguration under Network Delay Attack in Cyber-Physical Systems," *2022 International Conference on Electronics, Information, and Communication (ICEIC)*, 2022.

* Indicates the first author who contributed equally

Patents

[2] Young-gi Hong, Kyung-Joon Park, **Sanghoon Lee**, Jiyeong Chae, "Method and Apparatus for Detecting Leakage in Water Pipeline Networks," Republic of Korea, Application No. 10-2025-0008593, Jan 21, 2025.

[1] Kyung-Joon Park, **Sanghoon Lee**, Jiyeong Chae, "Leakage Detection Device and Method," Republic of Korea, Application No. 10-2024-0004960, Jan 11, 2024.

Awards and Honors

[7] Next-Generation Engineering Researcher by the IPESK

[6] 2024 Aero Future Tech & Business Idea Contest, Excellence Award in the Future Tech Division

[5] Selected as one of the "2023 Top 100 Excellent National R&D Achievements" (Participant Researcher)

[4] ACM MobiHoc Student Grant

[3] Dean's List for the Fall 2021 Semester

[2] Dean's List for the Spring 2021 Semester

[1] Dean's List for the Spring 2020 Semester

Professional Activities

Peer Reviewer

2025~ *Expert Systems With Applications*; *ELSEVIER Computers and Operations Research*;
IEEE Systems Journal; *IEEE Transactions on Network and Service Management*

2024~ *SPRINGER Machine Learning*; *ELSEVIER ICT Express*; *IEEE Transactions on
Industrial Cyber-Physical Systems*

2023~ *IEEE Access*

Domestic Publications

[4] Taehyun Kim, **Sanghoon Lee**, and Kyung-Joon Park, "End-to-End Latency Analysis of Reliable Communication in ROS 2 over Wireless Multi-hop Networks," *KICS Summer Conference*, June 2025.

[3] Hyunho Ryu, **Sanghoon Lee**, and Kyung-Joon Park, "Channel Modeling Analysis in Satellite-Terrestrial Integrated Network Using SDN Based Routing algorithm," *KICS Summer Conference*, June 2024.

[2] Haewon Jeon, **Sanghoon Lee**, Dong-Hyung Lee, Changhee Joo, and Kyung-Joon Park, "SDN Based Multipath Routing Algorithm in Satellite-Terrestrial Integrated Network," *KAAA Spring Conference*, April 2024.

[1] Jiyeong Chae, **Sanghoon Lee**, and Kyung-Joon Park, "Sound-based Machine Fault Diagnosis via Active Learning in Industrial Environments with Labeling Constraints," *KICS Winter Conference*, Jan 2024.