Jiyeong Chae

Ph.D. Candidate · Industrial Physical AI Researcher

Cyber-Physical Systems Integration (CSI) Lab · Daegu Gyeongbuk Institute of Science and Technology (DGIST)

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RESEARCH INTERESTS

Industrial Physical AI (IPAI) — bringing Physical AI down to the industrial floor across the two embodied platforms that drive modern manufacturing: the *Industrial AMR* that moves and the *Manipulator* that acts.

- **Industrial AMR**: ROS 2 Nav2 · Costmap Layers · Low-cost 2D LiDAR · Multi-AMR Cooperation · Lifelong Learning
- **Manipulator (extending)**: VLA · Foundation Models for Industrial Manipulation · Embodied AI Deployment
- **Industrial AI**: Domain Knowledge-driven ML · Active Learning · Fault Diagnosis · LLM-driven Operational Policies

EDUCATION

2023.02 – Present	**Integrated M.S./Ph.D.** in Electrical Engineering and Computer Science, **DGIST**, Daegu, South Korea Major GPA 4.10 / 4.3 (4.33 / 4.5) · Advisor: Prof. Kyung-Joon Park
2020.06 – 2020.08	International Student Programs, **University of California, Berkeley**, USA
2019.02 – 2023.02	**B.S.** in Computer Science, **DGIST**, Daegu, South Korea Major GPA 3.74 / 4.3 (4.03 / 4.5)

RESEARCH EXPERIENCE

2022.02 – 2022.12	**UGRP** — AI Technology for Industrial Cyber-Physical Systems, DGIST Undergraduate Research Program
2021.02 – 2021.12	**UGRP** — Indoor Localization System Using Wireless Sensor Networks, DGIST Undergraduate Research Program
2021 (Winter)	**Research Intern**, Cyber-Physical Systems Integration (CSI) Lab, DGIST
2020 (Summer)	**Research Intern**, Computer Architecture and Systems (CAS) Lab, DGIST

INTERNATIONAL PUBLICATIONS

13+ peer-reviewed papers · 8 first or co-first authored. * *indicates equal contribution.*

[13] **From Hype to Reality: A Survey of Physical AI in Industrial Robotics.**
Sanghoon Lee*, **Jiyeong Chae***, Jinhong Park, Kyung-Joon Park.
Engineering Applications of Artificial Intelligence (EAAI). Under Review.

[12] **Natural-Language to Operational Policies: LLM-Driven Costmaps for Industrial AMRs.**
Jiyeong Chae, Hyunkyo Seo, Heonjae Lee, Sanghoon Lee, Kyung-Joon Park.
Robotics and Autonomous Systems (RAS), Elsevier. Under Review.

[11] **Robust Localization in Dynamic Indoor Environments Using Structure-Guided Point-wise LiDAR Scoring.**
Yeong-gi Hong*, Donghyung Lee, Sanghoon Lee, **Jiyeong Chae**, Kyung-Joon Park.
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2026. Under Review.

[10] **Probabilistic Latency Analysis of the Data Distribution Service in ROS 2.**
Sanghoon Lee, Hyung-Seok Park, **Jiyeong Chae**, Kyung-Joon Park.
IEEE Transactions on Vehicular Technology (TVT). Under Review. *arXiv:2508.10413.*

[9] **Discovery Storm: Scalability Analysis of DDS and Zenoh in Large-Scale Wireless Robotic Networks.**
Sanghoon Lee, Yeonwoo Choi, **Jiyeong Chae**, Kyung-Joon Park.
IEEE INFOCOM NetRobiCS 2026 Workshop, Feb. 2026.

[8] **Time-aware Costmap for Smoother and Less Disruptive AMR Navigation With ROS 2.**
Jiyeong Chae, Hyunkyo Seo, Sanghoon Lee, Kyung-Joon Park.
International Journal of Control, Automation, and Systems (IJCAS), Dec. 2025.

[7] **From Issues to Routes: A Cooperative Costmap with Lifelong Learning for Multi-AMR Navigation.**
Jiyeong Chae*, Sanghoon Lee*, Hyunkyo Seo, Kyung-Joon Park.
Journal of Industrial Information Integration (JIII), Sep. 2025.

[6] **Poster: How to Send Large Data in ROS 2.**
Sanghoon Lee, Taehun Kim, **Jiyeong Chae**, Kyung-Joon Park.
IEEE International Conference on Network Protocols (ICNP) 2025, Sep. 2025.

[5] **Integrating ROS 2 and Physical AI: Architecture and Challenges.**
Sanghoon Lee, **Jiyeong Chae**, Kyung-Joon Park.
International Conference on Ubiquitous and Future Networks (ICUFN) 2025, Jul. 2025.

[4] **PINMAP: A Cost-efficient Algorithm for Glass Detection and Mapping Using Low-cost 2D LiDAR.**
Jiyeong Chae, Hyunkyo Seo, Sanghoon Lee, Kyung-Joon Park.
IEEE Transactions on Instrumentation and Measurement (TIM), May 2025.

[3] **Cyber-Physical AI: Systematic Research Domain for Integrating AI and Cyber-Physical Systems.**
Sanghoon Lee, **Jiyeong Chae**, Kyung-Joon Park.
ACM Transactions on Cyber-Physical Systems (TCPS), Feb. 2025.

[2] **False Alarm Prevention through Domain Knowledge-driven Machine Learning: Leakage Detection in Water Distribution Networks.**
Sanghoon Lee*, **Jiyeong Chae***, Sihoon Moon, Kyung-Joon Park.
IEEE Sensors Journal, Aug. 2024.

[1] **A Survey and Perspective on Industrial Cyber-Physical Systems (ICPS): From ICPS to AI-augmented ICPS.**
Jiyeong Chae*, Sanghoon Lee*, Junhyung Jang, Seohyung Hong, Kyung-Joon Park.
IEEE Transactions on Industrial Cyber-Physical Systems (TICPS), Oct. 2023. Top-5 most-cited paper in IEEE TICPS · 78+ citations.

DOMESTIC PUBLICATIONS

[D1] **Sound-based Machine Fault Diagnosis via Active Learning in Industrial Environments with Labeling Constraints.**
Jiyeong Chae, Sanghoon Lee, Kyung-Joon Park.
Korean Institute of Communication and Information Sciences (KICS) Winter Conference, Jan. 2024.

PATENTS

5 patents · 3 as first inventor.

[P5] **Method and Apparatus for Autonomous Robot Control Using Costmap Update.**
Jiyeong Chae, Hyunkyo Seo, Heonjae Lee, Sanghoon Lee, Kyung-Joon Park.
Republic of Korea, Application No. 10-2025-0213292. Filed.

[P4] **Method and Apparatus for Generating Indoor Maps (PCT International).**
Jiyeong Chae, Hyunkyo Seo, Sanghoon Lee, Kyung-Joon Park.
PCT International Application No. PCT/KR2025/016866. Filed.

[P3] **Method and Apparatus for Detecting Leakage in Water Pipeline Networks.**
Young-gi Hong, Kyung-Joon Park, Sanghoon Lee, **Jiyeong Chae**.
Republic of Korea, Application No. 10-2025-0008593, Jan. 21, 2025. Filed.

[P2] **Method and Apparatus for Generating Indoor Maps.**
Jiyeong Chae, Hyunkyo Seo, Sanghoon Lee, Kyung-Joon Park.
Republic of Korea, Application No. 10-2024-0145250, Oct. 22, 2024. Filed.

[P1] **Leakage Detection Device and Method.**
Kyung-Joon Park, Sanghoon Lee, **Jiyeong Chae**.
Republic of Korea, Application No. 10-2024-0004960, Jan. 11, 2024. Filed.

HONORS AND AWARDS

- [5] **Next-Generation Engineering Researcher Award (차세대 공학연구자상)**, Korea Institute of Engineering Promotion & Technology (KIET).
- [2–4] **Dean's List (Top Academic Performers)**, DGIST. Spring 2021 · Spring 2022 · Fall 2022.
- [1] **College Entrance Scholarship — Student of Remarkable Academic Excellence**, DGIST.

CONFERENCES ATTENDED

2026 ROSCon KR 2026 (Session, Seongnam, South Korea)

2025 AIoT 2025 (Seoul) · ROSCon 2025 (Singapore) · ICML 2025 (Vancouver, Canada) · KICS Summer 2025 (Poster, Jeju)

2024 AIoT 2024 (Seoul) · AW 2024 (Seoul) · ROSCon 2024 (Odense, Denmark) · KICS Winter 2024 (PyeongChang) · KICS Summer 2024 (Jeju)

2023 ICML 2023 (Hawaii, USA) · KICS Summer 2023 (Jeju)

PROFESSIONAL SERVICE — PEER REVIEW

2025 – Present.
NATURE *Nature Reviews Electrical Engineering*. **IEEE** *Transactions on Communications.*

2024 – Present. **IEEE** *Transactions on Industrial Cyber-Physical Systems (TICPS).*

TECHNICAL SKILLS

Robotics & Autonomy	ROS 2, Navigation (Nav2), SLAM, Localization (2D LiDAR, Vision), Multi-AMR Navigation
Simulation & Digital Twin	Gazebo, NVIDIA Isaac Sim (Omniverse)
ML for Industrial Systems	Domain Knowledge-driven ML, Active Learning, LLM-driven Navigation Interfaces
Systems / Networking	DDS Concepts, QoS Tuning
Programming & Tooling	Python, C++, Linux/Ubuntu

CITATIONS AND INDICES

Google Scholar: **120+ citations** (as of Apr. 2026). ICPS Survey paper ranked among the **Top-5 most-cited papers in IEEE TICPS**.

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