Jumpei Saito

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Research Interests

- Robotics, Embedded Systems, Human-Computer Interaction, Wireless Communications, Interactive Robotic Systems

Education

Bachelor (Expected), Faculty of Environment and Information Studies (SFC) *Apr 2024 – Mar 2028 (expected)*

Keio University

- Focus: Wireless Communications, HCI, Robotics.
- GPA: 3.69 / 4.00

Projects

RoboCup OnStage Team "Tomoshibi Technology" *Apr 2023 – Present*

Team Leader & Founder

Development of interactive multi-robot systems integrating mobility, actuation, and visual expression.

- Founded and led a robotics development team, Tomoshibi Technology, mentoring members with no prior robotics experience.
- Designed and implemented interactive robotic systems, including mobile displays and illuminated robotic arms.
- Integrated full-stack development including mechanical design (CAD), 3D fabrication, circuit design (KiCad), embedded software, and FPGA-based control.
- Built a coordinated system of up to 15 robots and achieved championship titles at national and international competitions (RoboCup Junior OnStage).

Swarm Robots as a Medium for Ecosystem Dynamics *Sep 2025 – Present*

Exploratory Project

Research on swarm robot coordination and interdisciplinary interactive expression.

- Designed and implemented a swarm robot coordination system for approximately 20 Sony toio robots with collision avoidance.
- Collaborated with researchers in audio signal processing and biological systems to explore mappings between swarm robot behaviors and ecosystem dynamics.

Research Experience

Undergraduate Researcher *Oct 2025 – Present*

Auto-ID Laboratory, Keio University — Advisor: Jin Mitsugi

Research on low-power wireless communication and signal processing.

- Designed and implemented QPSK baseband signal processing for backscatter communication.
- Implemented modulation/demodulation and evaluated communication performance using MATLAB.

Technical Staff *Mar 2025 – Present*

Narumi Laboratory, Keio University — Advisor: Koya Narumi

Technical support and system implementation for digital fabrication research.

- Implemented hardware, electronics, and control software for a pouch-actuator-based fabrication machine.

- Developed G-code-driven control software for fabrication workflows.
- Built custom experimental apparatuses used for digital fabrication research and data collection.

Research Mentee   *Apr 2023 – Mar 2024*
Experts in Information Science Program, National Institute of Informatics (NII)
— Advisor: Koya Narumi
Research on interactive display systems using autonomous mobile robots.

- Selected as one of 40 high school students nationwide for a highly competitive informatics research program at NII.
- Investigated methods for presenting images larger than physical screens through autonomous moving displays.
- Presented research outcomes through poster and oral sessions; awarded Best Presentation / Poster Award.

Publications / Posters

Invited Oral Presentation — WIDE Camp

Spring 2025

"RoboCup 2024 OnStage League Overall Championship: Challenges and Future Directions in Developing Interfaces for Expressing Virtual Worlds."

Poster Presentation — IPSJ 86th National Convention

2024

"An Interactive Display Method for Presenting Images Larger Than Physical Screens Using Autonomous Mobile Displays."

Technical Skills

Programming

- C/C++, Python, (others)
- ROS2, embedded HAL/RTOS (if used), Linux, Git

Hardware

- STM32, ESP32, FPGA (if applicable), KiCad, sensors/actuators

Awards

International & National Awards

2019 – 2024

- RoboCup Eindhoven 2024 OnStage League — 1st Place (Individual Team).
- RoboCupJunior 2024 Japan Open OnStage — Champion & Presentation Award.
- Best Poster / Presentation Award, IPSJ National Convention.
- Best Award, Experts in Information Science Program.
- SFC Award, Keio University.

Fellowships

Selected Fellowships

2022 – Present

- Masason Foundation Fellow.
- Experts in Information Science Program.
- Mitou Junior Program.
- SecHack365.
- Makers University U18.

Activities

Leadership & Community Activities

- Leader, Tomoshibi Technology.
- Organizer and technical contributor, Student Robot Expo.

Leadership & Community Activities

2023 – Present