

Jumpei Saito

Keio University | 2nd-year Undergraduate | Faculty of Environment and Information Studies
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Research Interests

Digital Fabrication, Robotics (multi-robot), Embedded Systems, Human-Computer Interaction, Wireless Communications, Interactive Systems

Education

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

Keio University

- Focus: Wireless Communications, Embedded Systems, Robotics.
- GPA: 3.68 / 4.00

Research Experience

Undergraduate Researcher

Oct 2025 – Present

Auto-ID Laboratory, Keio University — Advisor: Jin Mitsugi
Research on backscatter communication and signal processing.

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

Technical Staff

Mar 2025 – Present

Programmable Products Lab, 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 research-grade prototypes and data-collection apparatus for digital fabrication studies.

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.

Projects

RoboCup OnStage Team “Tomoshihi Technology”

Apr 2023 – Present

Team Leader & Founder

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

- Founded and led a robotics team from scratch, mentoring members with no prior robotics experience.
- Designed and implemented interactive robotic systems, including mobile robotic displays and illuminated actuated mechanisms.
- Led full-stack system integration spanning mechanical design (CAD), digital fabrication, circuit design (KiCad), embedded software, and FPGA-based control.

- Built and deployed a coordinated system of up to 15 robots; won championship titles at national and international RoboCup OnStage competitions.

Swarm Robots as a Medium for Ecosystem Dynamics

Sep 2025 – Present

Exploratory Project

Exploring swarm robots as an interactive medium for representing ecosystem dynamics.

- Implemented a swarm robot coordination system for 20 Sony toio robots with collision avoidance.
- Demonstrated the system in collaboration with researchers in audio signal processing and biological systems.

Technical Skills

Software

- C/C++, Python, Verilog, MATLAB, Linux, Git
- Embedded software (motor control, timing-critical control, inter-MCU communication)
- HAL-based MCU programming (STM32, ESP32, ATmega)
- FPGA-based communication and rendering pipelines (Gowin Tang series)

Hardware

- 3D printing (Ender-3, Guider 2S, Bambu Lab printers)
- CNC machining (KitMill CL200), laser cutting
- Mechanical design using Autodesk Fusion
- Schematic and PCB design using KiCad

Awards

- 2024 — RoboCup Eindhoven 2024 OnStage League: **Individual Team 1st Place**
International performance-robotics competition; won 1st place among 24 invited teams from around the world.
- 2024 — RoboCupJunior Japan Open 2024 OnStage League: **Champion & Presentation Award**
Won the championship after six consecutive years of participation; qualified for the world championship.
- 2024 — Experts in Information Science Program (NII): **Best Poster Presentation Award**
Received the program's top award among 40 selected high school students in NII's research mentorship program.
- 2025 — Keio University Shonan Fujisawa Campus (SFC): **SFC STUDENT AWARD**
Faculty-wide award; first-year undergraduate recipient in 9-years.

Fellowships & Grants

- 2022 – Present — Masason Foundation Fellow: **Full Scholarship**
One of 30 global fellows selected by Masayoshi Son (SoftBank Group) received cumulative funding exceeding JPY 10,000,000 for education and independent research.
- 2023 — MITOU Junior Program: **Selected Creator**
One of 20 under-18 participants nationwide; awarded a JPY 500,000 scholarship to develop a custom 3D-printed motor with mentorship.

Leadership & Outreach

- Successfully crowdfunded JPY 3,055,000 from 168 supporters to cover travel costs for the RoboCup Eindhoven 2024 competition.
- Founded and organized a student robotics and hardware expo (scheduled for Feb 2026) with confirmed funding of JPY 1,000,000 and 50+ registered participants.