Jumpei Saito

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

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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: 3.68 / 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 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.

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
Development 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.

Technical Skills

Software

- C/C++, Python, Verilog, MATLAB, Linux, Git
- Embedded software (motor control, robot internal networking, etc...)
- HAL-based MCU programming (STM32, ESP32, ATmega)
- FPGA-based communication and rendering pipelines (Tang Nano, Tang Primer)

Hardware

- 3D printing (Ender-3, Guider 2S, Bambu Lab)
- 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 a 6 year journey of continual challenge; earned an invitation to 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 (SFC): SFC Award
  Faculty-wide award; first-year undergraduate recipient in nine years.

Fellowships

- *2022 – Present* — Masason Foundation Fellow: Full Scholarship
  One of 30 global research scholars selected by Masayoshi Son (SoftBank Group) with funding for education and research buggets.
- *2023* — Mitou Junior Program: Selected Creater
  One of 20 under-18 participants nationwide; developed a custom 3D-printed motor with funding and 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 with confirmed funding of JPY 1,000,000 and 50+ expected participants (February 2026).