Irene Frizza

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Robotics Postdoctoral Researcher (JSPS) with 5+ years of hands-on experience in the design, prototyping, and experimental evaluation of humanoid robot subsystems. My work focuses on compliant mechanical architectures, actuation, and hardware validation.

Engineering Skills - Details

Mechanical Design: SolidWorks · Creo · large assemblies · DFA
Manufacturing & Prototyping: silicone casting · soft-material molding · 3D printing · CNC
Actuation & Mechanisms: pneumatics · springs · dampers · compliant mechanisms
Simulation & Modeling: Isaac Gym · MuJoCo · URDF · rigid-body dynamics · kinematics
Control & Learning: impedance control · torque control · RL (policy tuning, evaluation)
Programming: Python · C/C++ · MATLAB

Experience — Mechanical & Hardware - Details

2024–Present **Postdoctoral JSPS** — The University of Tokyo, Japan
Adjustable-stiffness humanoid joints — CAD design, elastic architectures, integration constraints

2024 **Engineer** — AIST (JRL), Tsukuba, Japan
Pneumatic actuation modules — mechanical layout, component selection (Moonshot lunar robotics)

2021–2023 **Researcher** — AIST (JRL), Tsukuba, Japan
Compliant humanoid feet — CAD, materials, fabrication planning, hardware testing

2020 **Mechanical Researcher** — LIRMM, Montpellier, France
Variable-stiffness mechanisms — concept design, simulation support, mechanical trade-offs

Selected Projects - Details

- **Soft Pneumatic Feet — Humanoid Robot** — Soft–rigid robotic foot with integrated pneumatic compliance. Defined CAD architecture, material selection, air-chamber geometry, and assembly constraints. Fabricated via soft-material molding, CNC machining, and 3D printing.
  SolidWorks · Pneumatics · Soft materials · CNC · 3D printing · Hardware testing **Portfolio** **Video**
- **Compliant Leg Joints — Humanoid Robot (RL Evaluation)** — Evaluation of compliant leg-joint architectures with parallel and series elasticity. Mechanical trade-off analysis on stiffness, damping, torque capacity, and integration constraints.
  Parallel/series elasticity · Isaac Gym · RL evaluation · Robustness testing **Portfolio** **Video**
- **Tunable-Stiffness Pneumatic Actuator** — Designed and manufactured actuated mechanism for contact-intensive applications. Defined mechanical layout and stiffness modulation principle. Built and tested prototypes to characterize stiffness range, dynamic response, and repeatability under load.
  Pneumatics · Mechanical design · Repeatability · Bench testing **Portfolio** **Video**
- **RGB-D Terrain Perception for Robotic Locomotion** — Real-time RGB-D terrain perception for adaptive foot placement in unstructured environments. Focused on perception-to-action integration for robust locomotion.
  Terrain mapping · Adaptive foot placement · Perception-to-action **Portfolio** **Video**

Education - Details

2023 **Ph.D. in Robotics** — University of Montpellier, France
Advisors: Gentiane Venture · Hiroshi Kaminaga · Philippe Fraisse

2019 **M.Sc. in Robotics & Automation Engineering** — University of Pisa, Italy
Advisors: Antonio Bicchi · Manuel Catalano

Recent Awards

- **JSPS Research Fellowship** — Japan
- **Kanako Miura Award** — Robotics Research Excellence