Leonardo Bove

Graduate Research Fellow in
Quantum & Electronic Engineering

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EDUCATION

M.Sc. in Electronic Engineering — Pisa, Italy
University of Pisa — Sep. 2023 – Oct. 2025

- Specialization: Embedded Systems & Mechatronics
- Thesis title: *Superconducting qubit readout and control system based on FPGA and development of a pulse sequencer*
- Thesis advisors: Professor Massimo Macucci, Professor Stefano Di Pascoli, Dr. David Van Zanten
- Relevant attended courses: *Wireless Integrated Circuits, Telecommunications, Digital System Design (FPGA), Embedded Systems*
- Degree grade: 110/110 *summa cum laude*
- Overall GPA: 4.0/4.0

B.Sc. in Electronic Engineering — Pisa, Italy
University of Pisa — Sep. 2020 – Jul. 2023

- Thesis title: *Dispersive Readout of the Transmon Qubit*
- Thesis advisor: Professor Massimo Macucci
- Relevant attended courses: *Solid State Electronics, Programming Languages and Computer Architecture, Programmable Electronic Systems, Computer Systems*
- Degree grade: 110/110 *summa cum laude*
- Overall GPA: 4.0/4.0

RESEARCH EXPERIENCE

Graduate Research Fellow in Quantum & Electronic Engineering — Pisa, Italy
Department of Information Engineering, University of Pisa — Sep. 2025 – Present

Recipient of a 3-month research fellowship titled "Measurement of relaxation and decoherence times in superconducting qubits".

- Characterization of multiple qubits using frequency multiplexing strategies.
- Management of the laboratory's dilution refrigerator infrastructure.
- Microwave path engineering: component sizing and selection, and system characterization using RF instrumentation (VNA, spectrum analyzer).
- FPGA development for qubit control and readout.
- Established a remote-access infrastructure for qubit experiments (*JupyterLab server*).

Master Thesis Project — Batavia, IL, USA
SQMS, Fermilab — May 2025 – Jul. 2025

- Designed and analyzed *QPCB*, a custom pulse frequency conversion board, using microwave EM simulations (*ADS Keysight*).
- Engineered *Qubase*, a Python-based high-level pulse sequencer for the *QICK* FPGA platform.
- Applied Qubase to characterize 2D and 3D superconducting qubits and support advanced quantum experiments.
- Automated calibration workflows for high-throughput measurements.

PROFESSIONAL EXPERIENCE

Chief Technology Officer — Pisa, Italy
E-Team Squadra Corse, FSAE team — Sep. 2023 – Sep. 2024

- Directed the development of the University of Pisa's EV race car (*Electronics & Software Divisions*).
- Approved and validated engineering projects.
- Oversaw high-voltage battery systems.
- Administered and maintained the team's GitLab server.
- Coordinated CI pipelines; reviewed pull requests and issue workflows.
- Fostered team cohesion through structured team-building initiatives.
- Organized personnel logistics and supervised technical activities.

Embedded Software Developer — Navacchio (PI), Italy
Sintonica s.r.l. — May 2023 – Sep. 2023

- Developed firmware drivers for TFT LCD displays on a custom embedded OS using Infineon PSoC ARM microcontrollers.
- Contributed to the layout and enhancement of the company's development kit PCB, integrating Cypress and nRF PSoC platforms.

PCB Designer and Embedded System Developer — Pisa, Italy
E-Team Squadra Corse, FSAE team — Sep. 2022 – Sep. 2023

- Led development of embedded software for onboard PCB systems.
- Implemented components of the Vehicle Control Unit using the FreeRTOS real-time OS.
- Engineered a multi-architecture bootloader (ARM/AVR) with CAN bus support.
- Performed unit and integration testing of firmware modules.

SKILLS

Software Development Tools & OS
Git, Linux, Windows

Programming Languages
C/C++, Python, Verilog, VHDL, MATLAB, Bash, Assembly

Quantum Computing
Superconducting qubit characterization, Qiskit, QuTiP

FPGA Design
Vivado, Quartus, ModelSim

Embedded Systems
STM32CubeIDE, PSoC Creator, Simulink Model-Based Design

Analog Design
SPICE, ADS, KiCad, Altium

MEMS Design & Simulation
COMSOL Multiphysics

Microcontrollers Architectures
AVR, ARM

PCB Design
KiCad, Altium

Lab & Fabrication
VNA, soldering, prototyping, Autodesk Fusion 360, 3D printing

LANGUAGES

Italian	Native speaker
English	C2 level (*Cambridge Assessment English*, overall score of 200 equivalent to IELTS 8.5, 2020)
German	B2 level (Linguistic Center *CLI* University of Pisa, 2022)
French	A2 level

Invited Talks & Presentations

"Superconducting qubit readout and control system based on FPGA and development of a pulse sequencer", Quantum Device Lab, Department of Physics, ETH Zürich, Zürich, Switzerland, July 23, 2025.

Grad Course Projects

SpaceFibre PLL Pisa, Italy
University of Pisa, *Wireless Integrated Circuits*, Professor Daniele Rossi Sep. 2022 – Sep. 2023

- Modeled and simulated a SpaceFibre-compatible 6.25GHz PLL, using the SG25H4 0.25 μm SiGe BiCMOS technology.
- Evaluated system stability and performance metrics.

Handwritten Digit Recognition Pisa, Italy
University of Pisa, *Digital System Design*, Professor Roberto Saletti Jan. 2025 – Feb. 2025

- Engineered a neural-network–based handwritten digit recognizer on the Altera DE10-Lite (MAX10 FPGA).
- Built a Python digital twin for training and quantization.
- Implemented custom Verilog drivers for touchscreen control and LT24 visualization.

Dual Axis Accelerometer Pisa, Italy
University of Pisa, *Sensor and Microsystem Design*, Professor Massimo Piotto Dec. 2024 – Jan. 2025

- Simulated a dual-axis MEMS accelerometer with T-shaped beams using COMSOL.
- Analyzed device performance and application range, benchmarking against lumped-element models.

Rubik's Cube Automatic Solver Pisa, Italy
University of Pisa, *Mechatronic Systems Design*, Professor Roberto Di Rienzo Nov. 2024 – Dec. 2024

- Designed a servo-actuated Rubik's cube solver robot controlled by an S32K144EVB.
- Developed the system using Simulink Model-Based Design.
- Built a digital twin of the complete robotic system.

Honors & Awards

Industry 5.0 Excellence Learning Path 2025
FoReLab project, University of Pisa
Specialized training program designed to develop advanced skills in next-generation industrial technologies by integrating research, innovation, and hands-on projects aligned with the principles of Industry 5.0.

Industry 4.0 Learning Path 2025
University of Pisa
Training program that provides practical and theoretical skills in digital manufacturing, smart automation, and modern industrial technologies aligned with the principles of Industry 4.0.

Extracurricular activities

Violin Montepulciano, Italy
"Hans Werner Henze" Institute of Music 2009 – 2021
Individual lessons and orchestral performances with the *Poliziana Orchestra* at the annual *Cantiere Internazionale d'Arte di Montepulciano*, in addition to periodic symphonic music concerts. Recipient of three merit-based scholarships awarded by the *Cantiere Internazionale d'Arte di Montepulciano* foundation.