

# Emanuele Aquilia

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GitHub • LinkedIn

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## Experience

### — IT Division Leader

Sep 2025 – Present — Turin, Italy

- Lead a team of students in designing, implementing, and maintaining IT systems for prototype bikes.
- Collaborated with the Electronics Division to develop and test embedded systems and sensors.
- Assisted the Electronics Division Leader in planning, timelines, and budget optimization.
- Coordinated cross-functional communication and resolved technical issues efficiently.
- Implemented software tools for monitoring prototype performance.
- Organized meetings and workshops to introduce newcomers and present division progress.

### — IT Division Member

Mar 2025 – Present — Turin, Italy

- Developed firmware for onboard electronic systems of prototype bikes.
- Conducted comprehensive system testing for durability and stability.
- Supported Electronics Division during track days, troubleshooting technical issues.
- Collaborated on PCB design and development to gain hands-on hardware experience.

## Projects

### Rowhammer Emulator in QEMU — Developer

May 2025 – Oct 2025 — Turin, Italy

- Developed a Rowhammer emulator integrated into QEMU to simulate attacks in virtualized environments.
- Implemented memory access patterns to trigger bit flips in DRAM modules.
- Implemented single-sided, double-sided, and PARA Rowhammer techniques.
- Conducted performance evaluations to measure effectiveness in real-world scenarios.
- Documented the emulator's architecture and usage for research purposes.

## Education

### Politecnico di Torino

*MSc in Computer Engineering — Embedded Systems track*

Expected March 2027 — Turin, Italy

DAUIN (Dipartimento di AUTomatica e INformatica)

### Politecnico di Torino

*BSc in Computer Engineering*

July 2024 — Turin, Italy

DAUIN (Dipartimento di AUTomatica e INformatica)

Final Grade: 93 / 110

## IIS Leonardo, Giarre

*High School Diploma — Applied Sciences*

July 2020 — Giarre, Catania, Italy

Final Grade: 96 / 100

## Skills

### Programming Languages

Intermediate (3+ years): Python  • Bash 

Beginner (1+ years): VHDL • Assembly 

• LaTeX

Familiar (0+ years): Verilog

### Technologies & Tools

Git / GitHub • Linux / UNIX • Windows  
Microcontroller programming & debugging

- Serial protocols (I2C, UART, SPI)
- CAN Bus • RTOS (FreeRTOS) • PCB Design • Altium Designer • PCB soldering
- QEMU • GDB • Wireshark • Oscilloscope
- multimeter • Logic Analyzer

## Languages

Italian: Native 

English: Advanced (C2) 

### **Vertigo and Refuso Firmware — Developer**

Mar 2025 – Present — Turin, Italy

- Developed the firmware for Vertigo and Refuso, two PCBs for data acquisition and motor control.
- Implemented communication protocols (I2C, UART, SPI) for sensor interfacing; Refuso sends gearbox data to the CAN bus.
- Implemented motor control algorithms on Vertigo based on Refuso data, enabling sequential gear shifting and sending the inserted gear to the CAN bus for analysis and display.
- Tested and debugged firmware to ensure reliability and performance in real-world conditions.
- Collaborated with hardware engineers to optimize firmware hardware integration.

## **Additional Passions and Skills**

- Enthusiast of vintage computer systems; currently building a 65C02-based computer and developing a custom PCB to improve debugging and experimentation.
- Electronics hobbyist with experience in designing, assembling, and testing custom PCBs for personal and academic projects.
- Experienced in 3D printing workflows, including slicing, print parameter tuning, material selection, and choosing optimal print orientation for strength and surface quality; motivated to expand skills by learning CAD design for full end-to-end prototyping.
- Interest in hardware security and secure embedded system architectures.
- Chess player, mainly active in online bullet and blitz formats.
- Passionate about motorcycle riding for both commuting and leisure; enjoy performing routine maintenance to deepen mechanical knowledge.
- Committed to a healthy lifestyle through regular gym training and balanced nutrition.

## **Soft skills & Extracurriculars**

### **Collegio Renato Einaudi**

April 2021 – Present — Turin, Italy

Member of a MIUR-accredited merit-based student housing community. Participated in personalized academic and soft-skill programs, cultural and interdisciplinary workshops, student leadership activities, and sports events. Gained experience in teamwork, mentoring, and project organization.

### **Tutoring**

Provided academic support to younger students in programming, mathematics, and physics, assisting with assignments, exam preparation, and practical exercises. Tutored in Python and C during high school and undergraduate studies, fostering understanding of fundamental concepts and problem-solving skills.

## **Coursework**

### **Graduate (MSc)**

- Computer Architecture II
- Cybersecurity for Embedded Systems
- Synthesis and Optimization of Digital Systems
- Microelectronic Systems
- Software Engineering
- Big Data: Architectures and Data Analytics
- Data Science and Database Technologies

### **Undergraduate (BSc)**

- Electromagnetism and Circuit Theory
- Applied Electronics
- Electronic Systems, Technologies and Measurements
- Object-Oriented Programming
- Automatic Control
- Signal Theory and Processing
- Computer Networks
- Computer Architecture I
- Databases
- Calculus I-II
- Linear Algebra and Geometry
- Mathematical Methods for Engineering
- Operating Systems
- Algorithms and Data Structures
- Programming Techniques
- Computer Science