Habib Ben Abda

hbenabda@student.ethz.ch | +41 78 929 57 47 | Zurich, Switzerland

linkedin.com/in/habib-ben-abda | github.com/mhbenabda

PROFILE

Specializing in embedded systems, sensor electronics, and firmware for wearables and medical devices. Experienced in creating low-noise acquisition circuits, developing human–machine interfaces, and integrating hardware–software systems for robust biosignal measurements (ECG, EMG, EEG, PPG).

SKILLS: C++/C | Python | AI | RTOS | MATLAB | PCB Design (Kicad/Altium) | Verilog | LTspice | CAD | Git

EDUCATION

ETH Zurich — Sept 2023 – May 2026
Master Electrical Engineering & Information Technology — Zurich, CH
Focus: Embedded Systems, Signal Processing, Electronics

University of Illinois Urbana-Champaign (UIUC) — Aug 2022 – June 2023
Exchange Year — Illinois, USA

EPFL — Sept 2020 – June 2022
Bachelor Microengineering — Lausanne, CH

WORK EXPERIENCE

Real World Robotics ETH — Aug 2025 – Jan 2026
Teacher Assistant — Zurich, CH

- Delivered a workshop and project-based assignments for a robotics course, mentoring 30 students on sensing technologies in robotic hands.

Johnson & Johnson MedTech — March 2024 – Aug 2024
Intern Digital & Robotics R&D — Basel, CH

- Automated optical tracking accuracy assessment for spine surgery robot extensions, using C++, reducing validation time by 90%, and supporting pre-market verification workflows.
- Assisted in various electrical/mechanical engineering tasks such as CTQ (Critical To Quality) definition, IEC 60601 assessment, DFM (Design For Manufacturing) and S&R improvements.

Chipiron — June 2023 – Sept 2023
Electronics Engineer Intern — Paris, FR

- Prototyped and tested a mixed-signal control system for MRI magnetic-field stabilization using a microcontroller and PID loop; worked with precision, low-noise analog front-ends under strong EMI constraints.
- Designed, simulated, and validated a cryogenic low-noise filter for a high-precision magnetic sensor, improving signal integrity through EMI reduction and impedance-optimized filtering.

Biosensors Lab @ UIUC — Aug 2022 – Jan 2023
Research Assistant — Illinois, USA

- Programmed an FPGA in Verilog to control biomedical camera lens focus for cancer cell detection during surgery and coded in Python to control testing instruments.

EPFL — Sept 2021 – Jul 2022
Teacher Assistant — Lausanne, CH

- Tutored groups of 10–40 students during weekly exercise sessions in the following courses: Electronics, General Physics, Thermodynamics, Analytical Geometry

EPFL Spacecraft Team — Feb 2021 – Jul 2022
Project Manager / Power Systems Engineer — Lausanne, CH

- Led a 2.7M CHF space mission to send the first student-led Swiss constellation of cube-satellites, managing interdisciplinary sub-teams to meet deadlines and ensure seamless collaboration.
- Pioneered and guided a major organizational strategy shift and persuaded 10+ university and industry partners to support this new vision.
- Optimized the satellite's power budget and operation schedule using MATLAB orbit simulations.

PROJECTS

Project Based Learning Lab — Sept 2025 – March 2026
Master Thesis — Zurich, CH

- Designed an embedded wearable system for continuous blood-pressure monitoring with real-time, low-power ECG/PPG processing and wireless transmission.
- Developed custom low-noise analog front-ends, integrated ECG/PPG sensors in multiple wear locations, and optimized signal quality, electrode placement, and motion-artifact robustness.

Technology: C | nRF52 | Zephyr RTOS | PCB Design | PyTorch

ETH Zurich — Feb 2025 – Aug 2025
Projects — Zurich, CH

- Built a real-time ultrasound image-reconstruction pipeline on an AMD Kria FPGA using deep learning to accelerate reconstruction.
- Developed a low-power embedded cough-counting system on the MAX78000 microcontroller, leveraging its hardware CNN accelerator for real-time respiratory monitoring.

Institute of Neuroinformatics — Sept 2024 – Jan 2025
Semester Project (link) — Zurich, CH

- Designed a non-invasive electrical stimulation controller (tTENS) including stimulation-waveform generation and electrode-skin interface circuitry for tactile sensory restoration.
- Conducted psychophysics experiments and supported medical-research authorization, gaining practical experience with human physiology, skin-electrode interfaces, and biosignal protocols.

Hackahealth — Nov 2024
Hackathon — Zurich, CH

- Built an IMU-based wearable assistive device to reduce hand-to-mouth movements in a cerebral palsy patient through real-time motion detection and audio feedback; focused on ergonomic wearable integration.

Personal Traits: Problem Solving | Curiosity | Leadership & communication | Planning & Organization

Languages: Trilingual – Fluent in **English**, **French**. Working proficiency in **German** (B2).