Charlotte Heibig

AEROSPACE ENGINEER

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Summary

Aerospace-focused EPFL graduate in Electrical and Electronic Engineering with experience in propulsion testing, avionics, and embedded systems. Proficient in flight hardware design and validation, real-time software development, and the implementation of experimental test benches for space applications.

Education

2023 - 2025	**M.Sc. in Electrical and Electronic Engineering**, Ecole Polytechnique Fédérale de Lausanne
2020 - 2023	**B.Sc. in Electrical and Electronic Engineering**, Ecole Polytechnique Fédérale de Lausanne

Research Experience

NASA Jet Propulsion Laboratory   *Pasadena, CA, USA*
VISITING STUDENT RESEARCHER, JVSRP   *May 2025 - November 2025*

- Master's Thesis : Development and Characterization of a Heated Helium Thruster Testbench for the Replication of Hydrazine Thruster Plume Conditions
- Defined and optimized thruster parameters to achieve target plume characteristics, designed and built a dedicated test bench, and validated performance through CFD simulations and experimental analysis.

Ecole Polytechnique Federale de Lausanne   *Lausanne, Switzerland*
TEACHING ASSISTANT   *January 2023 – July 2024*

- Supported 120+ students in the design and production of their prototypes at the new EPFL Makerspace, the SPOT.
- Trained students to use machines such as 3D printers, soldering equipment, and CO2 laser cutting machines

Industry Experience

Beyond Gravity Slip Rings SA   *Nyon, Switzerland*
INTERN ENGINEER ELECTRONICS   *August 2024 - March 2025*

- Designed Printed Circuit Boards for space and defense applications following ECSS or IPC standards
- Designed and conducted tests on the new and existing slip ring products

EPFL Rocket Team   *Lausanne, Switzerland*
AVIONICS TEAM LEADER, COMMITTEE MEMBER, TRAINING PROJECT MENTOR   *August 2022 - October 2023*

- **Project Nordend** : Design and fly a launch vehicle to compete in the European Rocketry Challenges 10k feet Student Researched and Developed bi-liquid category, the largest high-power rocketry competition in Europe.
- Led a team of 8 students in the design and implementation of the hardware, software and telecommunication system of the competition rocket
- Hardware based on a custom made board with an Stm32mp157 microprocessor and external RAM, and featured GNSS, sensor and radio extension boards, as well as a power module.
- Supervised the design, manufacturing and testing of the 8 GNSS, wifi and radio custom made antennas.
- Real time programming of Cortex-M4 as well as programming of the dual-core Cortex-A7 optimized for Linux
- **Project Spacerace** : Training project for first year students
- Guided a group of 6 students throughout the steps of designing to flying a level 1 rocket in an internal ERT competition

- **Project Wildhorn** : Design and fly a supersonic-capable launch vehicle to compete in the European Rocketry Challenges 30k feet Student Researched and Developed solid category, the largest high-power rocketry competition in Europe
- Designed, tested and manufactured the power and GNSS boards and developed the GNSS software for the competition rocket

Projects

Master's Semester Project at the EPFL Power Electronics Laboratory, Control of isolated DC/DC Converters and Comparison of Their Dynamic Performance.

- Implemented Matlab and PLECS models of the PSFB and SAB converters and simulated their steady state and dynamic responses
- Developed input DC link control strategies for both converters
- Performed Hardware in the Loop simulations and compared both converters' dynamic behaviors under different scenarios in order to find the most suitable topology for specific high-power MV applications.

Bachelor's Semester Project - Project Hermes, Hardware and software Design for a supersonic test rocket.

- Goal : Test the effects of supersonic flight on different aspects of the rocket (structure, sensors) for the association's main rocket Wildhorn
- Developed the software and PCBs with various sensors, as well as GNSS and radio capabilities

Power Electronics Project: Modeling, sizing, manufacturing and testing of a DC/DC flyback converter

Embedded Systems Design Project : FPGA-based Camera Streaming and Optimization

- Designed and optimized software for streaming video output from a camera connected to an FPGA, ensuring efficient data transmission and real-time processing

Android Application Design : Design and development of an application for controlling a Parrot drone used for data collection in specific areas

- Implemented various features such as image and video capture and storage in a database, autonomous flight capabilities by following waypoints, live tracking on a map and manual control

Skills

Programming and Embedded Systems : C, C++, Python, AVR/STM32 Assembly, VHDL, Verilog, Kotlin; STM32CubeIDE, RTOS, Embedded Linux; real-time systems, sensor integration, data acquisition; UART, SPI, CAN, I2C

Hardware and Electronics : PCB design and prototyping (KiCad, Altium Designer); ECSS and IPC standards; avionics systems

Simulation and Analysis : Matlab/Simulink, LabVIEW, LTSpice, Simcenter STAR-CCM+ (CFD); structural analysis, control system modeling

CAD and Mechanical Design : Fusion 360, 3D modeling

Languages : French (C2), English (C2), German (B2), Spanish (B1)