LUCAS FRERY

Electronics Hardware Engineer

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Seeking a permanent position in **PCB/PCBA design for robotic and embedded control systems**, with experience in mixed-signal I/O, power drivers, protection circuitry, communication interfaces, bring-up and validation. Available from October 2026.

WORK EXPERIENCE

Electronics Hardware Engineer – renco GmbH

Cologne, Germany | March 2026 – Present

- Designing a **Simulation Control Unit (SCU)**, a hardware-in-the-loop platform used to test and validate automotive ECUs by simulating analog, digital and communication I/Os.
- Architected a dual-**STM32F407ZGT7** hardware platform with inter-MCU **SPI communication up to 42 Mbit/s**.
- Designed 24 V-compatible I/O circuitry for 74 analog and 108 digital channels, including voltage scaling, filtering, ESD protection, **PWM** generation/measurement on 36 channels up to 2 kHz, high-side/low-side drivers, half-bridge and H-bridge outputs.
- Integrated automotive communication interfaces including **2 CAN, 2 LIN, 1 Ethernet RMII, USB-UART, SPI and I²C,** with associated transceivers and supporting circuitry.
- Performed schematic design and component selection in **Altium Designer**, supported by datasheet analysis, electrical design checks, reliability constraints and design-for-manufacturing considerations.

Hardware/Embedded Systems Engineer – ESTACARS (Formula Student)

Laval, France | September 2023 - January 2026

- Designed, simulated, and validated safety-critical **PCBAs** for an electric race car, covering schematic design, signal conditioning, and system integration (**KiCad, LTspice**).
- Resolved **EMI issues** in RS-485 BMS communication through hardware filtering, grounding strategy, and signal-integrity analysis, improving system robustness and reliability.
- Calibrated and commissioned the **electric powertrain** (inverter, motor, sensors), defining safe operating limits, troubleshooting, and validation procedures.
- Performed system-level **bring-up, testing, and root-cause analysis** during vehicle integration and track testing, ensuring reliable operation under real-world conditions.

R&D Engineer – Involute Transmissions

Falaise, France | May – October 2025

- Developed **computational models** to predict rolling-element bearing lifespan, power losses, deflections, stresses and stiffness under various operating conditions.
- Designed and programmed a **Scilab-based engineering tool with GUI** to automate bearing performance calculations and support engineering decision-making.
- **Validated simulation results** against commercial software, scientific literature and ISO standards to ensure model accuracy.
- Built knowledge in mechanical reliability, fatigue mechanisms and failure modes in high-load applications.

EDUCATION

ESTACA – Graduate School of Engineering (Master of Engineering)

Laval, France | Expected Graduation: Fall 2026

- Specialized in Automotive Embedded Systems and Electrical Engineering

SKILLS

Hardware Design: PCB design, hierarchical schematics, layout, signal conditioning, ESD/EMI protection, power electronics, driver circuits
Embedded Interfaces: STM32, SPI, I²C, UART, CAN, LIN, Ethernet, PWM, bridge conversion, ADC/DAC
EDA Tools: KiCad, Altium Designer, LTspice, STM32CubeMX
Programming: C, C++, Python, MATLAB/Simulink, Scilab, LaTeX
Mechanical & FEA: SolidWorks, CATIA, 3DEXPERIENCE
Languages: French native, English fluent, Spanish elementary

INTERESTS

Humanoid robotics, Electric vehicles, Motorcycles