

# VINCENT CAUQUIL

## Apprentice Research Engineer | Physics & Microelectronics Systems

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Apprentice Research Engineer with hands-on experience in **Cryogenic Electronics (4K)** and **Mixed-Signal IC Design**. Skilled in thermal budgeting for quantum setups and semiconductor physics. Seeking a PhD opportunity to advance **Computing Architectures** and develop **robust, high-speed acquisition interfaces** for quantum or constrained applications.

### EXPERIENCE

#### Apprentice Research Engineer CEA-Leti | Quantum Devices Laboratory



Sept 2023 – Sept 2026    Grenoble, France

- Focus:** Characterization and hardware development for quantum devices (FD-SOI & Cryogenics).
- Cryogenic Circuit Design (4K):** Currently designing a multiplexing and amplification circuit (cryogenic I/V converters) managing 50 I/Os, targeting high-speed signal integrity and thermal compliance.
  - Device Physics:** Characterizing FD-SOI substrate polarization effects (body factor) at room temperature to model transistor behavior.
  - Process Optimization:** Developed an automated dicing method for 300mm wafers, aiming to increase yield and speed compared to manual cleaving.

#### Research Intern Institute of Science Tokyo



July 2025 – Sept 2025    Tokyo, Japan

- Subject:** Cryogenic packaging and high-density interconnects.
- Designed an architecture using **off-the-shelf components** to enable the **sequential testing** of multiple quantum chips within a single cooling cycle.
  - Addressed strict **thermal dissipation** and spatial constraints specific to cryogenic systems (cryostat).

### EDUCATION

#### Engineering Degree Physics & Microelectronic Systems (PSM)



CPE Lyon – Class Valedictorian 🏆

Sept 2023 – Sept 2026    Villeurbanne, France

- Electronics & IC Design:** Analog/Mixed-Signal & RF Circuits, simple ASIC Design, Sensors & PCB Design.
- Digital & Computing:** FPGA Architecture, HDL (Verilog/VHDL), RISC-V (LiteX), AI for Integrated Design (ML/RL for EDA).
- Physics & Signal:** Semiconductor Device Physics, Quantum Mechanics & Computing, Digital Signal Processing.
- Research Initiation:** Seminars by Centrale Lyon researchers & drafting of an IEEE review paper on **Neuromorphic Processors** (🔗 Read).

#### Intensive Undergraduate Program Mathematics & Physics (CPGE PSI)



Institution des Chartreux

Sept 2021 – Sept 2023    Lyon, France

Two-year intensive preparation for the highly competitive entrance exams to French "Grandes Écoles". Focus on rigorous analytical reasoning and physics modelling.

### LANGUAGES

French: Native    English: Professional (C1)  
Spanish: Elementary    Japanese: Elementary

### SOFT SKILLS & INTERESTS

- Leadership & Open-mindedness:** 🧑‍🤝‍🧑 Rep. & Project Lead Developed autonomy & coordination.
- Creativity & Precision:** 🌙 Astronomy (Imagination & Problem-solving) 📷 Photography (Rigor).
- Discipline & Strategy:** 🏊 Swimming (Perseverance) 🏸 Badminton (Adaptability).

### ACADEMIC PROJECTS

- Smart Modular Parking (IoT/FPGA/Power):** Led the technical development and full system integration. Engineered the **RISC-V SoC** (LiteX/Custom Linux) on FPGA and full **BMS** architecture (RP2350/TI BQ IC's). 📁 Repository  
🏆 Most Technical Project Awarded at 2025 CPE Lyon Majors Competition
- Mixed-Signal IC Design (Cadence):** Full design of a **2<sup>nd</sup> Order CT ΣΔ ADC** (50dB SNR, 64 OSR) and a **4-bit R-2R DAC**. Validated via Monte-Carlo & Corner analysis.
- AI Optimization for Standard Cells (Sky130):** Developed a Reinforcement Learning tool to optimize logic cells' **PPA metrics** via automated SPICE/DRC loops. 📁 Repository  
💬 See detailed schematics, layouts, code and more project in my 📁 portfolio 💬

### TECHNICAL SKILLS

#### Physics & Cryogenics:

Cryogenics (4K/Dilution)  
Semiconductor Physics    RF Concepts  
Thermal Budgeting    Quantum Devices

#### EDA & Instrumentation:

Cadence Virtuoso    Spectre / SPICE  
KiCad    Xilinx Vivado    LabVIEW    LTspice

#### Programming:

Python 🐍    OpenCV PyTorch    MATLAB  
Verilog/VHDL    HTML/CSS    C/C++  
Assembly    🐧 Linux/Bash    MS365 📧 📁 📄 📑