

# Pierre Khalil

 pierre-khalil |  portfolio.overnault.ca |  pierre.khalil2105@gmail.com |  (587)-447-5118

## EDUCATION

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**Bachelor of Science in Electrical Engineering**  
*Schulich School of Engineering, University of Calgary*

**Expected Apr. 2028**  
**(Including internship)**

## INTERNSHIP STATUS

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Third year complete as of Apr. 30, 2026  
Seeking 12–16 month internship

**Available May 1, 2026**

## SKILLS

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- **Technical:** Power Electronics, Embedded Systems, Circuit Design, PCB Design, Low-Voltage Power Distribution, Over-Current Protection Selection.
- **Programming:** Python, C, SystemVerilog, JavaScript, HTML/CSS.
- **Tools:** KiCad, LTspice, Xilinx Vivado, Quartus, Multisim, GitHub, JLCPCB.
- **Professional:** Communication, Leadership, Time Management, Cross-Disciplinary Team Coordination.

## PROJECTS

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### Basys3 Discrete ADC System

**Dec. 2025**

- Led a 3-person team and authored SystemVerilog for **21+ RTL modules**, including all **verification testbenches**, for an ADC integrating XADC with PWM/R2R conversion.
- Implemented **five modes** (XADC, PWM/R2R ramp-compare, PWM/R2R SAR) using **8-bit codes**, fixed-point mV scaling, and a switch-driven 4-digit 7-seg UI (raw/avg/scaled; hex/BCD).
- Ran the design at **170 MHz** and met timing with **WNS = +0.676 ns** (TNS = 0); validated **0–3.3 V** behavior via oscilloscope and XADC cross-checks (typ. **tens of mV** error).

### AM Receiver Design and Demonstration

**Dec. 2025**

- Developed Multisim simulations and analysis for an AM receiver chain, including LC resonance sweeps over **100 kHz–10 MHz** and a **10-point** parametric sweep of **C1 (100 pF–1 nF)**.
- Built the antenna interface and active filter, and designed the output buffer; confirmed bias points and demodulation at **500 kHz** carrier / **5 kHz** modulation (**10 mV** input).
- Integrated the receiver with three teammates and demonstrated end-to-end operation, receiving **4 AM stations** with clear audio during evaluation.

### Custom RC Car with Embedded Control and BMS

**Apr. 2025**

- Designed a custom **2S 18650 BMS PCB** using **dual LM317** regulation (**8.5 V** at **600 mA**) and a **5 V** rail for the AVR, with protection circuitry and status LEDs.
- Integrated electronics in a **4-person team**, driving **4 DC motors** via **2 L298N H-bridges** with an AVR128DB28, plus ultrasonic ranging (**10  $\mu$ s** trigger, **16 MHz** timing) and metal detection.
- Implemented wireless control using **433 MHz RF** (validated to **2.3m** range with a **20 cm** transmitter antenna) and delivered a competition-ready prototype within a **\$69.39 BOM**.

### Raspberry Pi Homelab and Self-Hosted Productivity Platform

**Jan. 2025**

- Built a Raspberry Pi 4 homelab using Docker and Portainer, running **9 containers** across Nextcloud and FastAPI and hosting data on a **4.5 TB** drive.
- Deployed Nextcloud **v31.0.13** and built a FastAPI web app with authentication, scheduled reminders, and ntfy notifications, backed by SQLite.
- Enabled remote access via Tailscale/Cloudflare Tunnel and resolved container DNS/origin routing issues to improve reliability and login responsiveness.

## CLUBS

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**Hydrogen Eco-Car Team (Electrical)** Jan. 2026 – Present

*University of Calgary*

- Designing the high-voltage safety system across **5 core functions**: fuse sizing, main contactor control, precharge, interlock monitoring, and emergency shutdown paths.
- Designing a DC–DC boost converter to a regulated DC bus with **4 protections** (OV/UV/OC/OT), including power-stage selection, gate drive, and sensing/feedback.

**Schulich Ignite Mentor** Oct. 2025 – Present

*Schulich School of Engineering, University of Calgary*

- Mentor high school students (Grades 9–12) in weekly programming workshops, reinforcing Python and core CS concepts.
- Support debugging and guided exercises; review submissions using rubrics and provide constructive feedback.

**Embedded in Embedded (EiE)** Sep. 2025 – Present

*Schulich School of Engineering, University of Calgary*

- Industry-mentored embedded systems program focused on firmware and hardware/software integration using **RTOS-based** development practices.
- Built projects on **Nordic nRF52840** using Zephyr RTOS; applied a **3-tool stack** (C, Python, CMake) in open-source build/flash/debug workflows.

## WORK EXPERIENCE

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**Youth Coordinator** Sep. 2023 – Present

*St. Mina Coptic Orthodox Church, Calgary, Alberta*

- Lead weekly sessions for youth ages 4–12, fostering teamwork, structure, and engagement.
- Plan and supervise activities for 30+ participants while ensuring safety and inclusivity.
- Coordinate with parents and staff to ensure smooth execution and consistent programming.

**Crew Member** Aug. 2021 – Dec. 2021

*Booster Juice, Red Deer, Alberta*

- Prepared and served 200+ products per shift while maintaining quality and speed.
- Delivered consistent customer service in a high-pace environment while coordinating with team members.
- Processed customer orders and payments accurately while handling special requests under peak rush.

## VOLUNTEER EXPERIENCE

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**Chef** Jul. 2019 – Sep. 2019

*Mustard Seed, Red Deer, Alberta*

- Prepared and served 200+ meals per shift for individuals and families experiencing food insecurity.
- Collaborated with 10+ volunteers to coordinate food preparation and distribution efficiently.
- Fostered a respectful and welcoming environment for guests during service hours.

## CERTIFICATIONS, TRAINING & AWARDS

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Engineering Entrepreneurship Certificate, Schulich School of Engineering Jan. 2024 – Present

Engineering Leadership Certificate, Schulich School of Engineering Jan. 2024 – Present

Alexander Rutherford Scholarship Aug. 2023

HCS3000 and HCS3010 Workplace Safety, St. Gabriel Online School Jul. 2020 – Aug. 2020

Communication and Body Language, Dr. Sami Fahmy Nov. 2018 – Feb. 2020

Public Speaking, Dr. Sami Fahmy Mar. 2019 – Jun. 2019