

EDUCATION

- **Carleton University** Ottawa, ON
Bachelor of Engineering in Electrical Engineering; *Sep. 2019 – May. 2025*

PROJECT EXPERIENCE

- **Custom CMOS Integrated Circuit – Pseudo-Random Sequence Generator** Ottawa, ON
Carleton University *Dec. 2023*
Cadence Virtuoso
 - Designed, simulated, and fabricated a full custom CMOS IC pseudo-random sequence generator (PRSG) using Cadence Virtuoso from architectural concept through fabrication.
 - Developed RTL logic behavior and verified functionality using schematic-level testbenches.
 - Designed core digital blocks (XNOR with reset, D-Flip-Flops, Oscillator, Output Driver, Input protection).
 - Completed layout design, adhering to size constraints while achieving full DRC/LVS clean sign-off.
 - Performed post-silicon validation using wafer probing and lab instrumentation.
 - Debugged simulation vs silicon mismatches, demonstrating strong root-cause analysis skills.
 - Gain exposure to power, timing and signal integrity trade-offs at transistor and block level.
- **CMOS Operational Amplifier – 45nm SOI Process** Ottawa, ON
Carleton University *Dec. 2023*
Cadence Virtuoso
 - Designed and verified a low power CMOS operational amplifier with differential input and output buffer.
 - Performed PVT corner analysis (27 corners) to validate performance across process, voltage, and temperature variations.
 - Optimized transistor sizing and biasing to improve gain-bandwidth product and stability.
 - Developed a multi-finger transistor layout with symmetry utilizing dummy transistors to.
 - Completed full custom layout, ensuring symmetry, matching, and parasitic-aware design; verified with DRC/LVS.
- **Gesture-Controlled Robot – Embedded Systems & RF Communication** Ottawa, ON
Carleton University *April 2023*
Arduino, C/C++, SPI, I2C, RF
 - Developed embedded firmware in C++ for Arduino-based systems using I2C and SPI peripherals (MPU6050 IMU, NRF24L01 RF module).
 - Implemented real-time RF communication and low-speed protocol validation under varying noise and power conditions.
 - Integrated motor drivers, sensors, and wireless modules, validating signal integrity, grounding, and power distribution at the board level.
 - Designed and 3D-printed a custom PLA chassis in Fusion 360, optimizing weight, durability, and component placement.
 - Delivered a fully functional prototype demonstrating wireless wearable-controlled robotics with potential for accessibility and assistive technology applications.

TECHNICAL SKILLS

- **Digital Design & Verification:**

- RTL Design & Verification: Verilog, SystemVerilog.
- Testbench Development & Debug: ModelSim, Questa.
- Digital Logic: FSMs, sequential logic, PRSGs, clocked systems.
- PCB Design
- Verification Concepts: functional coverage, assertions (conceptual), corner-case analysis. Debugging RTL vs simulation mismatches.

- **EDA & Silicon Tools:**

- Cadence Virtuoso (schematic, simulation, layout, DRC/LVS).
- ModelSim, Questa.
- Quartus, Vivado.
- LTspice.
- KiCad, Altium Designer.

PROGRAMMING SKILLS

- **Languages:** Verilog, Python, Matlab, Java, C, C++

- **Architecture & Systems Knowledges:** Computer organization fundamentals, Datapath and control logic Timing, reset strategies, clock-domain awareness, Hardware/software interaction, Power-Performance-area (PPA) trade-offs

SOFT SKILLS

- Strong analytical and problem-solving mindset.
- Detail oriented with focus on first-time-right hardware.
- Collaborative team player with strong communication skills.
- Self-driven learner with a strong passion for Design and Verification.