Ruhan Shah

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Technical Skills

Languages: C++, Python, SystemVerilog
Embedded Systems: Arduino, FPGA, UART, SPI, I^2C, CAN, GPIO, Ethernet, PID Control
Hardware: PCB Design, Schematic Design, Soldering, Oscilloscope, Logic Analyzer, Multimeter, Motor Control, Encoders
Tools: Altium Designer, KiCad, Vivado, PetaLinux, Yosys, Icarus Verilog, GTKWave, Git, Docker, VS Code, Visual Studio, Microsoft Office

Experience

FPGA Team Member September 2026 – Present
Waterloo Reality Labs *Waterloo, ON*

- Built a parameterized 1 Hz LED blinker in SystemVerilog from a 25 MHz clock; synthesized for ECP5 using Yosys and analyzed logic resources
- Verified three parameter configurations with a self-checking Icarus Verilog testbench, detecting injected timing errors and inspecting waveforms in GTKWave

Electrical Team Member September 2026 – Present
Waterloo Aerial Robotics Group (UWARG) *Waterloo, ON*

- Developed a 5 V-to-3.3 V regulator schematic in Altium Designer, integrating a MIC5365 fixed-output LDO, 1 μF input/output capacitors, and screw-terminal power interfaces
- Created custom schematic symbols and PCB footprints for SC70-5, 0603, and through-hole components, translating datasheets into pin mappings, pad geometry, and terminal pitch

Embedded Systems Member June 2026 – Present
AlbertaSAT *Edmonton, AB*

- Contributed to an FPGA-based On-Board Computer test platform using the Xilinx Zybo Z7-20 to emulate Xiphos Q7S interfaces for CubeSat avionics development
- Configured and validated UART, SPI, I^2C, CAN, GPIO, and Ethernet interfaces using Vivado and PetaLinux for satellite subsystem communication testing
- Built and tested CAN bus interface circuits and debugged communication protocols using serial consoles and logic analyzers

Technical Article Writer August 2025 – Present
Aro Robotics Systems *Edmonton, AB*

- Authored technical articles on robotics products and their real-world applications, reaching 1,500+ readers through research-driven, SEO-optimized content

Projects

PID Motor Speed Controller | *C++, Arduino, KiCad* May – August 2026

- Built and soldered a DC motor control system using an Arduino, TB6612FNG driver, and 6 V encoder motor; designed the schematic and custom PCB in KiCad
- Implemented closed-loop PID speed control using encoder feedback and 8-bit PWM; tuned proportional, integral, and derivative gains through serial monitoring

4-DOF Robotic Arm with Vision Control | *C++, Python* March 2026

- Designed and built a 4-DOF Arduino robotic arm, developing C++ firmware to control servo motion
- Integrated MediaPipe-based hand tracking in Python for real-time vision control and refined motion through iterative prototyping and testing

Education

University of Waterloo Waterloo, ON
Bachelor of Applied Science in Electrical Engineering *Sept. 2026 – May 2031*