

Arunabha Ghosh

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Education

McMaster University

Expected Graduation April 2028

Bachelor of Engineering in Electrical Engineering (B.Eng.) (Co-op)

Hamilton, Ontario

Relevant Coursework: Logic Design, Signals & Systems, Microprocessor Systems, Circuits & Systems, Data Structures & Algorithms, Electrical Systems Integration, Communication Systems, Statistics

Skills

Languages: Python, Perl, C, C++, ARM Assembly, SystemVerilog, Verilog, VHDL, MATLAB & Simulink, TCL, Bash

Development Tools: ROS, Linux, Cadence OrCAD PSpice, Git, GitHub, Intel Quartus, ModelSim, Altium Design

Design Concepts: RTL Design, UVM Verification, FPGA Programming, Embedded/Real-Time Systems, Timing Analysis

Experience

General Dynamics Mission Systems – Canada

May 2026 – Present

Systems Integration, Verification & Validation Engineering Co-op

Ottawa, Ontario

- Performing system integration, testing, and verification of embedded and real-time defence systems in simulated operational environments
- Executing verification and validation activities including requirements analysis, test execution, and defect investigation to ensure traceability and compliance with system requirements
- Developing and contributing to test automation, debugging, and system validation, identifying and resolving hardware-software integration issues in collaboration with multidisciplinary teams

Supply & Demand

May 2025 – August 2025

Experience Technician

Mississauga, Ontario

- Assisted with system calibration, fault diagnosis, and verification of projection-mapping systems using OpenCV and LiDAR-based motion sensors to ensure precise alignment and real-time collision detection
- Integrated AR subsystems with physical display modules, synchronizing virtual overlays to user motion data for a seamless mixed-reality experience
- Diagnosed and resolved performance issues across hardware and network systems, reducing system latency while improving accuracy and reliability

Projects

Autonomous Electric Vehicle: Python, C++, ROS, Linux, Optimization, Embedded Systems

April 2026

- Developed **embedded software** in C++ and Python within **ROS on an ARM-based NVIDIA Jetson Nano** for real-time autonomous vehicle control
- Processed and fused **LiDAR, camera, IMU, and odometry data** using a **probabilistic occupancy grid mapper** with **inverse sensor models and log-odds updates** for real-time state estimation
- Designed and validated **feedback-linearizing and PD control algorithms** using **QP-based virtual barriers** for real-time collision avoidance and safe steering
- Integrated and debugged a **multi-node ROS system**, validating hardware-software integration and real-time performance using **Linux tools, ROS logging, and RViz-based simulation**

Configurable Memory Controller: Perl, SystemVerilog, Intel Quartus, ASIC/SoC Design, UVM

November 2025

- Implemented a **parameterized memory controller** in SystemVerilog following **ASIC and SoC design principles**, supporting configurable burst length, data width, and latency cycles
- Designed **synthesizable RTL** with distinct **read/write FSMs** and ready/valid handshake protocols
- Developed a **UVM-based testbench** for functional verification using randomized read/write transactions and scoreboard-driven validation
- Automated design verification with **Perl scripts** that generate concise CSV summaries of simulation results

3D LiDAR Scanner: C, Python, Assembly, Open3D, Microcontroller, Embedded Systems

April 2025

- Engineered an embedded system capable of 3D spatial mapping using a **TI-MSP432E401Y microcontroller**, **VL53L1X Time-of-Flight sensor**, and **28BYJ-48 stepper motor**
- Programmed in **C** and **Assembly**, transmitted real-time sensor data to the MCU via **I2C**, then via **UART** to a Python-based visualization script
- Rendered **interactive 3D point clouds** using **Open3D** and visualized scanned environments with accurate spatial depth

CMOS XOR Gate: MOSFETs, Digital Logic, Circuit Design, PSpice

March 2025

- Prototyped a **CMOS XOR logic gate** using discrete **NMOS & PMOS** transistors from CD4007B ICs
- Verified functionality using **logic analyzers** and static/dynamic waveform tests
- Measured **rise/fall times and propagation delay** to evaluate timing performance, validating **signal integrity** and correct XOR switching through **voltage-level** and waveform analysis