

Swarup Majumder

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EDUCATION

University of Illinois at Urbana-Champaign

GPA: 3.74/4.00

Bachelors of Science in Computer Engineering

Graduation: May 2027

Relevant Coursework: Data Structures and Algorithms (C++), Operating Systems (C, RISC-V, UART), FPGA Lab (SystemVerilog, AXI, SPI), GPU Parallel Programming (CUDA), Digital Signal Processing, Analog Signal Processing

EXPERIENCE

Systems Programming Course Staff

Aug 2025 – Present

University of Illinois at Urbana-Champaign

Champaign, IL

- Mentored 30+ students weekly, providing technical feedback for C, C++ and Assembly projects

Undergraduate Research Assistant

May 2025 – Present

Parasol Lab, University of Illinois at Urbana-Champaign

Champaign, IL

- Benchmarked C++ STAPL and STL algorithm runtimes across 64 samples (99% Confidence Interval)
- Enabled multi-GPU STAPL execution using C++ and CUDA, achieving 100x speedup over CPU base
- Streamlined compilation, linking and execution for 25+ MPI configurations via Bash and Linux tools
- Automated data visualization using Python to graph runtime metrics, accelerating algorithm analysis

Robotics Software Mentor/Lead

Dec 2022 – Aug 2024

FIRST Robotics Competition Team 4096

Champaign, IL

- Used Python to interface with the CAN bus to reliably control 30+ motors across 8 subsystems
- Deployed computer vision AI object detection to provide operator feedback, reducing cycle times by 30%
- Managed Git workflows to ensure effective parallel development among 7 software team members

PROJECTS

Camera Vision Pipeline on FPGA | SystemVerilog, RTL Design, I2C, Vivado

Nov 2025 – Dec 2025

- Designed real-time camera video streaming pipeline in pure RTL, achieving sub-microsecond latency
- Initialized 40 camera registers via I2C with a custom SystemVerilog controller for stable color output
- Implemented filters and UV thresholding in SystemVerilog with line buffers for seamless edge detection
- Integrated Vivado XADC IP-based brightness dial with 128 discrete levels for precise luminance scaling

Interactive Thermometer | Oscilloscope, Multimeter, Circuit Design

Feb 2025 – May 2025

- Built a temperature measurement circuit with op-amps and comparators, supporting a range of 0–99 C
- Designed an analog-to-digital stage to drive 7-segment displays showing temperature and user thresholds
- Verified signal integrity, temperature, and threshold accuracy using an Oscilloscope and Multimeter

24-Hour Clock | Arduino IDE, C++, Circuit Design

Feb 2025

- Built an Arduino-based 24-hour clock using C++ to display time with precise minute-level accuracy
- Implemented multiplexed control for 4x7-segment displays, reducing I/O to 11 pins with 4 ms cycles
- Integrated a potentiometer interface converting analog input to time values for real-time calibration

SKILLS

Programming: C, C++, SystemVerilog, Verilog, Python, CUDA, Bash, Java

Protocols/Interfaces: I2C, UART, SPI, CAN, AXI-4 Lite

Tools: Git, Linux, GDB, Vivado, MPI, NVIDIA NSight, Docker

Hardware: Oscilloscope, Logic Analyzer, Function Generator, Multimeter, Soldering