Chirag Maheshwari

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Education

University of Illinois, Urbana Champaign — Champaign, IL
BSc. in Computer Engineering — *Aug 2022 - May 2026*
Courses: Computer Systems Engineering (ECE 391), Computer Architecture (ECE 411), Digital IC Design (ECE 482), Analog IC Design (ECE 483), VLSI for ML (ECE 498), Parallel Programming (ECE 408), Machine Learning (ECE 449), Numerical Methods (ECE 491)

Skills

Languages: C++, C, Python, Rust, SystemVerilog, Chisel, VHDL, HTML & CSS, LaTeX, Javascript
Libraries & APIs: PyTorch, OpenCV, OpenGL (Minecraft Clone), CUDA, Triton (Raytracer), nMigen/LiteX, ImGUI, PyQt5
Tools & Technologies: Xilinx Vivado, STM32, KiCad/Altium Designer, Zephyr/FreeRTOS, Linux, Cadence Virtuoso, HSPICE

Experience

ECE 391 (Operating Systems) Staff — Champaign, IL
Course Assistant — *August 2025–*
- Developed MPs and exam problems that utilized RISC-V assembly, C and kernel programming concepts

Rivian Automotive Inc. — Champaign, IL
Hardware Validation Intern (Special Projects) — *February 2025–August 2025*
- Developed RTOS firmware and infrastructure for next-generation ADAS hardware bring-up and characterization, reducing validation cycle time through automated frameworks
- Implemented C/C++ drivers for high-speed I/O, I2C, SPI and image processing pipelines
- Created SystemVerilog FPGA modules for Hardware-in-the-Loop (HIL) testing of critical peripherals and subsystems

National Center for Supercomputing Applications — Champaign, IL
SPIN Intern, Gravity Group — *August 2023 – May 2024*
Developed an interactive Python-based data visualization framework for black hole gravitational wave simulations

Projects and Extracurricular Involvement

RISC-V Vector Accelerator CPU Tapeout (ECE 427) — May 2025 –
- Selected for chip tapeout project to design a pipelined RV32IMC CPU with Zve64x (Vector) extension
- Responsibilities include RTL implementation, UVM verification, and physical layout for silicon fabrication

RISC-V Unix Kernel (Winner of ECE 391 Design Competition) — December 2024
- Implemented device drivers, support for virtual memory, a filesystem, syscalls, multi-threading, pre-emptive scheduling and spin-locks
- Implemented a "breathing fire" demo inspired by FPS shooter DOOM for extra-credit showcase

Liquid Rocketry at Illinois — February 2023 –
Electronics Lead
- Designing STM-32 based PCBs and Firmware for next-generation Flight Vehicle and High-Voltage Test-Stand Systems. Utilized FreeRTOS and RF-based telemetry/control.

IEEE/Open-Source @ Illinois — August 2023 –
Technical Exec Member
- Held workshops on Git, Linux, open-source digital design tools, LT-SPICE simulation and KiCad for 50+ underclassmen

Digital Design Projects
- Designed a systolic array-based hardware accelerator for transformer inference to target the PYNQ-Z2 FPGA
- Migrated MiSTer SNES design and Altera IPs to Vivado and Xilinx hardware. Implemented clock-gating and custom DDR3 controller to emulate SDRAM to mitigate latency requirements.

Honors

Finalist: Advanced Track (Hardware), HackIllinois 2024 (Seekbot - LLM-powered robot with YOLO based object detection)
3rd place: MITRE Embedded CTF 2023 with SIGpwny. Implemented Secret Handling using embedded Rust
2nd Place: Software Competition at Pulse 2025, a UIUC ECE Conference (Open Track); 1st Place: Beginner Track Pulse 2023
Qualified for the Indian National Olympiad in Informatics in 2021 and 2022