Nikhil Vishnoi

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Education

University of Illinois at Urbana Champaign   Aug 2022 - May 2026
BS in Electrical Engineering and BS in Nuclear Engineering   3.83/4.0
  Minor in Computer Science

Relevant Course Work: Data Structures (CS 225), Computer Architecture (CS 233), Digital Systems Laboratory (ECE 385), Computer Systems Engineering (ECE 391), Advanced Digital Projects Lab (ECE 395), Electronic Circuits (ECE 342, ECE 343, ECE 340), Signal Processing (ECE 210, ECE 310), VLSI System Design (ECE 425)

Skills

- *Software:* C, C++, Python, Java; Assembly (MIPS, RISC-V); Verilog, SystemVerilog; bare-metal embedded programming; FPGA SoC firmware development;
- *Hardware:* Microcontrollers (PIC, STM32, Arduino); FPGA SoC platforms (Spartan, BAYSE); DAC/ADC integration; custom circuit design; SPI, I^{2}C, UART, USB, AXI bus communication; mixed digital-analog interfacing
- *Tools:* Oscilloscope, Multimeter, SMT Soldering, KiCad, gdb, Linux, Vivado, Docker, LTSpice, git, Cadence

Experience

Sandia National Laboratory   *Livermore*, California
R&D Intern (National SULI program)   May 2025 - Aug 2025
- Implemented custom USB firmware on Arduino modifying HID to spoof trackball
- Integrated Arduino-controlled servo with NI DAC-based IV measurements to automate strain test measurements with proper timing constrained measurements
- Created custom high voltage operational amplifier circuit for Piezo driving
- Built Python tools to process and analyze multidimensional data

Lawrence Livermore National Laboratory – National Ignition Facility   *Livermore*, California
R&D Intern (National SULI program)   May 2024 - Aug 2024
- Designed and conducted deposition experiments to create dense films of a novel high entropy alloy.
- Characterized film structure and composition using SEM, EDS, Confocal Microscopy, LIBS, and XRF.

Center for Plasma Material Interactions   *UIUC*, Illinois
Undergraduate Research Assistant   Oct 2022 - Dec 2024
- Developed multi-threaded Python control software with GUI for synchronized equipment operation using Sockets and Pyvisa.
- Wrote an automation on top of the control system for Langmuir Probe plasma characterization
- Built Matlab/Python scripts for experimental data analysis and figure generation.

Bitkiva Inc   *Santa Clara*, CA
Software Engineer Intern   June 2022 - Aug 2022
- Programmed real-time dynamic filters in C for structured data streams; optimized memory with Valgrind.

Bitkiva Inc   *Santa Clara*, CA
Software Engineer Intern   June 2021 - Aug 2021
- Designed an in-memory Java database with custom search features.
- Built Selenium web scraper to automate CSV collection and metadata generation.

Projects

Robot Hand
- Worked in team of 2 to design a robot hand for an advanced digital lab class (ECE 395)
- Created custom PCBs to utilize STM32 micro controllers and other ICs to create a glove sensor to send data to a servo based robotic hand using UART.

Simple Operating System
- Worked in team of 2 to design a RiscV64 operating system for an computer system engineering class (ECE 391). End product had a running shell that interacting with a file system and basic linux commands and features
- My contribution involved threads (preemptive multitasking for U mode and round robin for S mode threads), processes(single thread, with forking support), virtual memory (SV39), virtio devices (viorng, vioblk).

Chess Arcade Game
- Worked ontop of a SoC Microblaze on top of a Spartan 7 FPGA for an digital laboratory class (ECE 385)
- Customized AXI port graphics driver (SystemVerilog) to implement frame buffers and pixel by pixel drawing
- Created C-based chess engine with modulability to enable alpha beta pruning algorithm to interact with