# ADI NIKUMBH

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## EDUCATION

**University of Illinois Urbana-Champaign** <div align="right">Champaign, IL</div>
*BSc Computer Engineering, Minor in Mathematics* <div align="right">*Expected Grad. May 2026*</div>
- **Courses**: Data Structures & Algorithms (C++), Applied Parallel Programming (CUDA), Analog Signal Processing, Digital Systems Laboratory (FPGA), Operating Systems (Assembly, C), Control Systems (MATLAB)

## EXPERIENCE

**Aetherflux** <div align="right">San Carlos, CA</div>
*Software Systems Engineering Intern* <div align="right">*Dec. 2025 - Jan. 2025*</div>
- Incoming Winter 2025 Intern

**NVIDIA** <div align="right">Santa Clara, CA</div>
*Technical Product Engineering Intern - CUDA Python* <div align="right">*Aug. 2025 - Nov. 2025*</div>
- Incoming Fall 2025 Intern

**Tesla** <div align="right">Palo Alto, CA</div>
*Embedded Software Engineer Intern - Optimus Robotics* <div align="right">*May 2025 - Aug. 2025*</div>
- Incoming Summer 2025 Intern

**Rivian** <div align="right">Palo Alto, CA</div>
*Embedded Software Engineer Intern - Core Firmware Platform* <div align="right">*May 2024 - Aug. 2024*</div>
- Developed bootloader for S32K3 microcontroller to enable OTA updating of Gen2 steering wheel haptic controls
- Implemented 9 main modules, incl. CRC data validation, CAN frame handlers, & UDS/ISOTP security layer
- Optimized linker script to partition memory into 3 regions, enabling simultaneous storage of app & bootloader
- Implemented boot manager to control logic for updating bootloader, bootloader updater, & main application
- Leveraged Bazel build system to automate build toolchain, modularize SDK files, & execute unit tests

**Illini Electric Motorsports** <div align="right">Champaign, IL</div>
*Electrical Team Captain & Software Lead* <div align="right">*Mar. 2024 - Present*</div>
- Lead IEM Electrical Team, organizing 3 subteams (Hardware, Software, LV Integration) spanning 25+ engineers
- Lead ECU design & development, & powertrain upgrades for 600V battery, improving EV reliability & efficiency
- Architect FreeRTOS port for VCU, allowing 4× speedup of motor control algorithm for improved vehicle control
- Design & build HITL test setup for vehicle, enabling 20% speedup in integration cycle of software & hardware
- Redesign BMS SW & HW with next-gen chips, reducing IC count by 30% & enhancing performance/robustness
- Handled full integration of 2024 car software: rewrote control algorithms, debugged C, achieving 2.2× score boost

*Embedded Software Engineer - BMS Software* <div align="right">*Sept. 2022 - Mar. 2024*</div>
- Developed SOC algorithm to report cell capacity, utilizing SimuLink & enhanced Coulomb Counting algorithm
- Wrote embedded C drivers for STM32 microcontroller to write SOH of battery to EEPROM for cell monitoring
- Create monitoring scripts for 6 BMS faults to ensure integrity & proper operation, maximizing driver safety

## PROJECTS

**CUDA Convolutional Neural Network** | *CUDA, C, NVIDIA NSight*
- Created multi-threaded neural network to class images based on clothing type using convolution algorithm
- Engineered & optimized 2-layer CUDA-based forward pass for LeNet-5 network, resulting in 0.86+ accuracy
- Applied 5+ optimization techniques, including CUDA streams, parameter sweeping, shared memory access, & input matrix unrolling, yielding 4000%+ runtime reduction compared to baseline serial CPU kernel

**RISC-V Unix Operating System Kernel** | *C, RISC-V Assembly, QEMU*
- Developed RISC-V operating system kernel, integrating features such as preemptive multithreading, virtual memory paging, interrupt handling, & I/O devices, allowing for execution of multiple concurrent user processes
- Created QEMU virtio-blk drivers to interface with filesystem image, allowing file for access & ELF execution
- Developed 10+ syscalls for user/kernel interaction, such as exec, fork, & pipes for inter-thread communication

## TECHNICAL SKILLS

**Languages**: C, C++, CUDA, RISC-V Assembly, Python, SystemVerilog, MATLAB/Simulink
**Comm. Protocols**: CAN, UDS/ISOTP, SPI, isoSPI, UART, i2C
**Developer Tools**: Git, Docker, VSCode, Vivado, Bash, Linux/Unix, GDB, Ozone
**Libraries**: pandas, NumPy, matplotlib, Seaborn, PCan, SciPy, Bazel, SConscript
**Misc**: Oscilloscope, Logic Analyzer, Circuit Analysis, Debugger,
**Prof. Interests**: Embedded Systems, AI/ML, Edge Devices, Robotics , Electrification, Control Systems