Prakhar Gupta

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Education

University of Illinois Urbana Champaign **Aug. 2022 – May 2026**
B.S. - Computer Engineering *GPA: 3.7*

Relevant Coursework

- Computer Architecture
- Operating Systems
- Digital Design
- Advanced VLSI
- Digital Signal Processing
- Transistor Circuits
- Parallel Programming (CUDA)
- Data Structures
- Algorithms

Experience

ARM **May 2025 – Aug 2025**
Verification Intern, Architecture and Technology Group *Austin, TX*

Siemens Healthineers **Jan 2025 – May 2025**
Electrical Engineering Co-Op, Molecular Imaging *Hoffman Estates, IL*

- Developed FOC motor control firmware for on the TI C2000 platform, enabling multicore execution and hardware accelerator integration
- Profiled and optimized ISR runtimes and FIR filter performance; tuned cascaded PID control loops, and added paging support to enhance ISR efficiency
- Modernized internal ADC calibration tool by refactoring legacy tuning algorithms from IDL to Python and replacing COM with file-IO based IPC.
- Designed test fixture, assembled and reworked PCBs, and assisted with hardware testing

National Center for Supercomputing Applications **Jun 2024 – Dec 2024**
Intern, Systems Group *Urbana, IL*

- Deployed telemetry service to track executable and library usage in data centers, improving operational visibility
- Pre-empted logging with signal handlers before job termination, and partial log retrieval from tmpfs for failed processes
- Optimized telemetry by configuring filters to reduce log volume and developed build and ingestion scripts
- Worked with systems engineering team on data center maintenance and SW updates

Mobility and Fall Prevention Research Lab **Jan 2023 – May 2024**
Undergraduate Research Assistant *Champaign, IL*

- Deployed scientific computing pipeline. Performed code profiling and improved performance by 25%. Developed vector-based analyses for studying network dynamics
- Automated environment and data management with bash scripts. Wrote acquisition/ingestion scripts for large datasets
- Developed, tested, and assembled custom wireless sensing devices for clinical studies

ECE Department, University of Illinois **Jan 2024 – Dec 2024**
Undergraduate Teaching Assistant *Champaign, IL*

- Analog Signal Processing: Organized weekly lectures, created assignment outlines and final project base design
- Operating Systems: Developed auto grader scripts assignments, Helped debug development issues during office hours

Projects

Linux Kernel | *C, x86* : Developed a custom kernel from scratch for a single-core x86 system. Implemented hardware drivers, memory paging, interrupt handling, filesystem support, syscalls, and a round-robin scheduler for concurrency. Additionally, created a UART-based PvP TicTacToe and Soundblasters game, (3rd in design competition)

Out-of-Order rv32-im CPU Design | *SystemVerilog, Synopsys* : Designed and synthesized a 6-stage out-of-order ERR-style CPU with pipelined caches. Improved performance by implementing a fully parameterized prefetcher, pre-commit store buffer, split load/store queues, and branch predictor. Verified the design with layered test benches, directed tests, and constrained random testing. Benchmarked performance with scoreboards and counters during parameter sweeps.

Sensor System | *ESP-IDF, KiCad* : Designed a 2d-array of sensors for a smart-mat , incorporating op-amp input buffers and ADCs for signal acquisition. Implemented dynamic pairing and real-time data logging, while performing custom PCB design and board bring-up using KiCad.

Technical Skills

Languages: C, Python, SystemVerilog, C++, Assembly, Go
General: Linux, Git, Bash, Docker, CMake
Hardware: Synopsis VCS/DV, KiCad, Xilinx Vivado, TI CCS, ESP-IDF, Pico-SDK, FreeRTOS