Prakhar Gupta

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Education

University of Illinois Urbana Champaign **Aug. 2022 – May 2026**
Bachelor of Science in Computer Engineering

Relevant Coursework

- Computer Architecture
- Operating Systems
- Distributed Systems
- Data Structures
- Digital Signal Processing
- Electronic Circuits
- Discrete Math
- Engineering Stats

Experience

National Center for Supercomputing Applications **Jun 2024 – Present**
Intern *Urbana, IL*

- Worked with the SEAS group to deploy telemetry service to track executables and software library usage on HPC clusters
- Increased performance by 13x with in-memory log caching and aggregate file transmission on a parallel file system
- Enhanced reliability by implementing signal handlers for preemptive logging before job timeout. Integrated log retrieval from cache in the Slurm Epilog
- Configured service to collect telemetry inside containers and support python module tracking

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

- Deployed scientific computing pipeline. Performed code profiling and improved performance by 25% via parallelization (cupy, numba, and cython). Developed vector-based analyses for studying network dynamics in the brain
- 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 **Jan 2024 – Present**
Undergraduate Teaching Assistant *Champaign, IL*

- Analog Signal Processing: Organized weekly lectures, created assignment outlines and final project base design

Indian Institute of Technology (IIT) **Jun 2023 – Aug 2023**
Full-Stack Intern *Mumbai, India*

- Developed front-end user systems and an authorization microservice for a internal platform
- Implemented end-to-end services within an MVC architecture using Express, MongoDB, and other full-stack toolkits
- Wrote and tested API endpoints with Postman, and implemented a real-time pub-sub service with websockets

Engineering IT - Helpdesk **Sep 2022 – Apr 2023**
L2 IT Consultant *Champaign, IL*

- Used tools like AD and MECM to support enterprise PC networks. Configured servers and campus infrastructure
- Worked with automated imaging build and deploy tools in Jenkins. Used IPAM for subnet management

Projects

Linux Kernel | *C, x86* : Developed a kernel from scratch for a single-core x86 system. Implemented hardware drivers, paging, interrupt support, filesystem, syscalls, and concurrency through a round-robin scheduler. Implemented UART PvP TicTacToe and Soundblasters (3rd place in design competition)
DSP Harness | *C, FreeRTOS, ARM CMSIS* : Created a DSP harness on a dual-core cortex M0+ system to support digital filters via user-provided function references. Configured DMA, ADC, I2S codec, integrated FreeRTOS, and the ARM CMSIS-DSP library
Wireless Sensor | *ESP-IDF, MQTT, KiCad* : Designed an electronic sensor for a Tribo-Electric Nano Generator sensor. Used op-amp input buffer and ADC for signal acquisition. Implementing wireless services like dynamic pairing and real-time data-logging. Custom board bringup in KiCad

Technical Skills

Languages: C, Python, C++, Assembly, SystemVerilog, JavaScript
General: Linux, Git, Bash, Docker, CMake

Publications / Leadership

Open-Source at Illinois
CSL Student Conference 2024
SBIs