Krishnan Shankar

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Education

University of Illinois Urbana-Champaign — Expected Graduation: May 2027
Bachelor of Science in Computer Engineering — GPA: **3.98/4.0**

- Relevant Coursework: Computer Architecture (CPU Design), Operating Systems Design, Digital Systems (FPGA) Lab, Parallel Programming (CUDA), Distributed Systems, Control Systems, Cryptography

Thomas Jefferson High School for Science & Technology — Fairfax, VA
Fairfax County Public Schools, Advanced Studies Diploma — GPA: **4.467/4.0**

Work Experience

Emerging Technologies Student Researcher — Jun 2023 — Mar 2026
The MITRE Corporation — *McLean, VA*

- Designed and built a **novel 5G proxy** to improve speed/bandwidth for non-5G access to 5G networks
- Integrated the proxy into a US government application, achieving a **99.93% reduction** in first connection time
- Presented in six company-wide briefings and two sponsor presentations, currently writing a research paper for publication

Lead Student Systems Administrator — Jun 2021 — Present
TJ Computer Systems Lab, Fairfax County Public Schools — *Alexandria, VA*

- Configured a high-availability, triple-replicated network filesystem (and block device) using Ceph and NFS
  - The system now serves over **2000 students and faculty** and securely stores over **250TB of data**
- Developed Turn-In, a code autograder that has saved manual grading of over **500,000 student submissions**
- Worked on and responsible for a 50+ node high-performance computing (HPC) cluster, a Docker-based website hosting platform, a centralized authentication system (LDAP, Kerberos), DNS/DHCP configuration, and self-hosted mailservers

Extracurricular Activities

Chair - GNU/Linux User Group @ UIUC — May 2025 — Present

Embedded Team Lead, Purple Team Lead - SIGPwny (Cybersecurity @ UIUC) — Apr 2025 — Present

- Won the 2025 CSAW Embedded Security Challenge using sophisticated side-channel and fault injection attacks

Club President - TJ Unmanned Aerial Vehicle (TJ UAV) — Feb 2021 — Aug 2024

- Designed a **triple-radio communications system** for autonomous flight, RC control, and high-speed image transfer
- Developed a custom ground station using Flask and React for telemetry, object detection/classification, and payload drop

Projects

Superscalar, Out-of-Order RISC-V Processor - Report — Mar 2026 — May 2026

- Achieves an IPC of 0.646 on CoreMark, at a clock frequency of **561.8 MHz**, with an area footprint below **0.3mm^2**
- Implemented explicit register renaming, 2-way superscalar with early branch resolution, and a split load/store queue

FPGA Flight Simulator - Code, Report — Oct 2025 — Dec 2025

- Implemented hardware-accelerated graphics capable of **full 3D rendering** at 640x480 resolution with a 60Hz refresh rate
- Designed a physics engine simulating a 6-DOF aircraft (similar to a Boeing 747) with live, accurate response to user input

64-bit RISC-V Operating System — Aug 2025 — Dec 2025

- Implemented virtual memory, an EXT2-like filesystem, syscalls, forks, pipes, and a bash-like shell, all from scratch in C

- Strife, an open-source clone of modern chat apps like Discord/Slack, built from scratch with Django and websockets
- A custom NixOS configuration to declaratively manage the OS, software, and dotfiles for my PC and laptop
- 20+ Hackathon projects (built with a team), 15+ desktop/terminal games, 10+ custom websites, and so much more

Technical Skills

- **Languages**: **Python** (Django, Flask, PyTorch), **Rust**, Nix, SystemVerilog, C, C++, Bash, JavaScript, Go, Java
- **Technologies**: **Linux** (NixOS, Debian/Ubuntu, RHEL, Raspberry Pi), **Git** (GitHub, GitLab), Ansible, Docker, Kubernetes
- **Full-Stack Web Development**: Django/Flask, NodeJS, Svelte, React, HTML/CSS/JavaScript, SQL, Firebase