

# Pradyun Narkadamilli

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## EDUCATION

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**University of Illinois Urbana-Champaign**, Bachelor of Science in Computer Engineering May 2025  
*O. Thomas and Martha Purl Scholarship, IEEE HKN Honor Society, Dean's List (Fall 2021-Present)* 4.0/4.0 GPA  
**Relevant Coursework:** Computer Architecture, Digital IC Design, Computer Systems Engineering (OS),  
Digital Systems Lab, Digital Signal Processing, Analog Signal Processing, Data Structures

## EXPERIENCE

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**Hardware Engineering Intern**, IMC Trading [imc.com](https://imc.com) June 2023 to August 2023

- Developed system to filter/publish critical network messages to host from FPGA, reducing PCIe load by 50%
- Designed and implemented RTL modules to unpack, tag, and arbitrate between multiple time-varying UDP streams
- Identified key risk factors and failure points in design, added hardware performance counters and assertions
- Created module-level and functional testbenches on Verilator-based C++ verification stack
- Outlined and prototyped deployment-facing API in C++ to interface with new networking stack
- Built software to remotely monitor FPGA deployment's performance counters and hardware assertions

**Researcher**, Passat Research Group [passat.crhc.illinois.edu](https://passat.crhc.illinois.edu) July 2023 – Present

- Designed and prototyped hardware accelerator for FlashAttention attention layer topology
- Working with PI to investigate hardware acceleration architectures for generative neural networks (LDMs)

**Operating Systems Course Assistant**, University of Illinois Urbana-Champaign Aug 2023 – Present

- Conducted office hours and graded for various operating systems projects, such as a Linux-like Kernel capstone project
- Taught and composed course materials for exam review sessions, including revised course notes, practice problems, etc.

**Digital Systems and FPGA Course Assistant**, University of Illinois Urbana-Champaign Jan 2023 – Present

- Rewrote and created course documentation for SystemVerilog, verifying designs in ModelSim, and testing designs on FPGA
- Hosted office hours for course's FPGA-based projects, notable examples include VGA text controller and toy processor

**Director of Information and Technology**, HKN Honor Society Board [hkn.illinois.edu](https://hkn.illinois.edu) Jan 2023 – Jun 2023

- Organized student-hosted project demos to expose ECE undergraduates to opportunities available within the department
- Held review sessions, hosted office hours, and offered peer tutoring for various courses in introductory and ECE curriculum

**Vice President**, WaggleNet Research Group [waggle.net](https://waggle.net) Nov 2021 – Jan 2023

- Led 7-person team researching computer vision software for embedded motion tracking using OpenCV and TensorFlow
- Fully migrated archaic data storage and logging mechanisms to the cloud using AWS Cognito, DynamoDB, and Lambda
- Integrated existing Raspberry Pi-based dataloggers with aforementioned AWS pipeline to track temp, humidity, etc.

## PROJECTS

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### RISC-V Core

Developing superscalar (4-issue) speculative out-of-order core implementing RV32I spec.

- Structured to minimize area and delay constraints in 45nm FreePDK

### NES Emulator [pradyun.tech/work/naes](https://pradyun.tech/work/naes)

Recreated commercial Nintendo Entertainment System (NES) SoC on DE-10 Lite FPGA.

- System can play standard iNES-formatted ROMs on a Motorola 6502 core, video output is displayed over 60Hz VGA
- Designed PPU (architecture-specific GPU), peripheral emulation hardware, and memory interfaces
- Demoed at ECE 385 Showcase for exceptional projects, running games like Ice Climber, Pac-Man, and Super Mario Bros.

### Linux-Like Operating System

Designed and implemented kernel from scratch for use with single-core x86 systems.

- Functionalities: Paging-only virtual memory, read-only filesystem compatibility, round-robin scheduler (per-terminal)
- Capabilities: Up to 10 interactive shells concurrently, keyboard/mouse support, running a POSIX-like shell

### DIY Arduino [pradyun.tech/work/pradyuino](https://pradyun.tech/work/pradyuino)

Created a standalone microcontroller board flashed with standard Arduino bootloader.

- Hand-designed PCB schematic, implemented prototype with ATmega328P MCU and solder traces on THT protoboard
- Later added USB support on protoboard version, migrated base spec to digital PCB design using KiCAD

### Kami [pradyun.tech/work/kami](https://pradyun.tech/work/kami)

Uses Machine Learning to scan and summarize text documents with cross-platform support.

- Uses PyTesseract OCR engine to read text from images, then uses NLTK model to summarize text
- Leveraged Angular.js framework to make a web application, and Flutter to make a cross-compiling native application
- Set up/administrated EC2 Linux server on AWS with Nginx and Gunicorn to serve backend Flask API

## TECHNICAL SKILLS

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**Hardware:** SystemVerilog, Verilog, Synopsys VCS, Verdi, Xilinx Vivado, Intel Quartus, HSPICE, Cadence Virtuoso, Verilator  
**General:** Python, C, C++, Rust, [ba]sh scripting, x86 Assembly, Linux Systems, Git, Github