Om Tank

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Education

University of Massachusetts Amherst

*Bachelors in **Computer Engineering - May'25** | Renewable Energy (ICons)*

Coursework: Embedded Systems(A-), Security Engineering(A-), FPGA Programming(B), Computer Networking(A),Math for ML(B)

Certifications: Computer Architecture, Design Verification using UVM, AWS Cloud Practitioner, VLSI Design (ongoing)

Relevant Experience

Logic/Design Verification Intern @ AMD **Boxborough, MA**

Advanced Micro Devices *Summer'24*

- Optimized gate-level designs applying logic minimization techniques, reducing area utilization in ZEN microprocessor cores.
- Built modular UVM-based testbench components and assertions to verify instruction logic and corner cases.
- Automated design verification processes using Python and SystemVerilog, reducing testing cycle time by 30%.
- Partnered cross-functionally with RTL, DFT, and P&R teams to ensure full PAT (power, area, timing) compliance.

Research Experience

Neuromorphic Computing Researcher **Amherst, MA**

Bio-Medical Engineering Lab *Fall'23*

- Designed analog circuits on - Nafion wafers, exploring non-silicon alternatives for VLSI.
- Optimized circuit design, achieving 12% power efficiency improvement through power and signal integrity analysis.
- Tested and debugged circuits with Keysight Agilent oscilloscopes and logic analyzers, verifying reliability and performance.
- Co-authored a research paper on Squishy Bioelectronic Circuits, contributing to power modeling and circuit analysis.

Embedded Systems Engineering Intern **UMass Amherst**

Core Summer Internships *Summer'23*

- Developed a prosthetic arm control system integrating motors and a MyoWare muscle sensor to interpret EMG signals.
- Designed an embedded system for real-time signal processing, ensuring seamless translation of movement to motor control.
- Optimized control algorithms to improve grip strength, achieving a 10% enhancement over traditional prosthetic models.
- Conducted extensive testing and calibration to ensure reliability, improving user dexterity and interaction with objects.

Senior Design Project

Neely 33, A Smart Shoe - Digitizing Motion **New York, NY**

Neely & Daughters *Fall'24 to Summer'25*

- Led cross-functional team of 4 engineers, developing intelligent wearable shoe based on client's requirements, integrating pressure sensors, IMUs, and Nordic nRF52840 MCU for gesture-based control.
- Architected embedded C++ firmware implementing real-time sensor fusion algorithms, processing accelerometer, gyroscope, and pressure data with 12ms BLE latency.
- Designed custom flexible PCB incorporating voltage regulators, battery charging circuitry, and power management system achieving 16-hour continuous operation.

Leadership and Co-Curricular

Founder and Events Coordinator, Indian Student Union at UMass Fall'2022 - Summer'25

- Founded and scaled the organization to over 850 active members, fostering a thriving community that celebrates Indian and South Asian culture.
- Planned and executed high-impact cultural events, including *Fashion Ka Jalwa* and the *ISU Gala* recognizing community achievements through awards and performances.

Skills

Technical Languages: Verilog, System Verilog, Python, C++, C, Unix, TCL, CUDA
Developer Tools: Altium, HSPICE, Oscilloscopes, Virtuoso, KiCAD, MATLAB, Cadence, Synopsys
Soft Skills: Leadership, Communication, Adaptability, Cultural Competence, Resilience, Teamwork

Work Experience

AI Program Manager **Amherst, MA**

College of Natural Sciences - iCons *Present*

- Facilitate identification and integration of AI agents across diverse research labs, streamlining workflows and assist in developing a new educational track revolving around AI and the Future of Work.

Staff IT **Amherst, MA**

Center for Agriculture, Food and Environment *Spring'25*

- Provided technical support and troubleshooting for staff at the Center of Agriculture, ensuring smooth operation of IT systems and minimizing downtime.

MakerSpace Hardware Engineer **Amherst, MA**

M5 *Fall'24*

- Instructed peers on safe and effective use of workshop tools, including soldering equipment, oscilloscopes, and function generators, to support hands-on prototyping and hardware development.

Residential Hall Security Manager **Amherst, MA**

RHS *Fall'23*

- Oversaw safety and security operations for the residential halls, ensuring a secure environment for all residents.

Projects

GNN based Circuit Timing Prediction for VLSI Design | PyTorch, Python, NetworkX Present

- Develop a Graph Neural Network architecture using PyTorch Geometric to predict gate delays in digital circuits, to achieve <10% mean absolute percentage error on synthetic circuit benchmarks.

GPU-Accelerated RTL Logic Simulator based on Nvidia's GEM | CUDA, Verilog June'25

- Develop a CUDA-based RTL simulator for basic Verilog circuits, translating RTL into logic gate models and design a custom logic executor mimicking a simplified VLIW architecture to enable word-level parallelism on Nvidia GPUs.

UVM-Based Verification Environment for 32-bit Aligner | SystemVerilog, UVM testbench Spring'25

- Developed modular UVM components including RX/TX agents, predictors, register model, and scoreboard to enable full stimulus-response validation.

4-Tap FIR Filter on Intel DE1-SoC FPGA | Verilog, RTL Design Winter'25

- Designed a 4-tap FIR filter using a scalable modular architecture with ARM Cortex-A9 HPS integration, real-time testing, and BIN2BCD display on 7-segment LEDs.

Hardware Trojan Detection using Side-Channels | Verilog, Modelsim, Power Analysis Summer'24

- Developed novel approach to detect hardware Trojans using simulation-based side-channel features achieving 93.5% detection accuracy across multiple circuits by PCA dimensionality reduction on behavioral data.

BananAI - Detection of Anthracnose Infected Banana Cells using AI | Python, Tensorflow, Meta's SAM Spring'24

- Architected machine learning pipeline utilizing Meta's Segment Anything Model (SAM) for automated lesion segmentation in plant pathology.

Analog Circuits Design for Random Number Generation | Verilog, VHDL, SPICE Fall'23

- Designed a RNG using Linear Feedback Shift Registers for pseudo-random and Ring Oscillators for true rng, implemented on Altera SoC using Quartus Prime and ModelSim

Federated Learning on Heterogeneous Sensors | Jupyter Notebooks, Python, Data Science Fall'23

- Analyzed data heterogeneity and adversarial robustness in federated learning systems across 5 datasets, revealing critical trade-offs between model performance, convergence efficiency, and attack resilience in distributed environments.

Publication

Squishy Bioelectronic Circuits Cellpress Devices

- Co-authored an open-access paper on squishy bioelectronic circuits published in *Cell Press Devices*, contributing circuit design and electrical characterization.

Smart Shoes - First Steps in Bio-Mechanical Sensing IEEE Pervasive Computing

- Authored an open-access paper on the technology of the Neely 33 Smart Shoe, under review in *IEEE Pervasive Computing Journal*.