Jashwanth Bamidi

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EDUCATION

University of Illinois Urbana-Champaign — Champaign, IL
Bachelor of Science in Electrical Engineering — *Expected Graduation: May 2027*
GPA: 3.84/4.00
Relevant Coursework: Digital Logic Design, FPGA Laboratory, Computer Systems, Electronic Circuits, Analog Signal Processing, Digital Signal Processing, Applied Parallel Programming, Data Structures, Design Laboratory

EXPERIENCE

Eco Illini — Aug 2025 – Present
Battery Management System — *Champaign, IL*
- Led the **Power Distribution Unit** and **Joule Meter** PCB-Design teams in developing power regulation and monitoring systems using **KiCad**, reducing prototype iteration cycles by 30%.
- Designed and simulated DC-DC buck converters and LDO voltage regulators to supply stable 12 V and 3.3 V rails for sensors and control units with less than **50 mV** ripple.
- Developed and validated current and voltage sensing circuits using INA228 and STM32 microcontrollers; achieved less than **1%** measurement error verified through **LTSpice** simulations and **oscilloscope** testing.
- Collaborated with powertrain and telemetry teams to integrate **CAN** and used **SPI** and **I2C** communication protocols between components, improving data reliability.

Illini EV Concept — Aug 2024 – Present
Motor Encoder Team — *Champaign, IL*
- Spearheaded the design and simulation of encoder PCB using **KiCad** and **LTSpice**, achieving a **15%** improvement in motor speed feedback accuracy.
- Conducted full bring-up and validation with **oscilloscopes**, **logic analyzers**, and differential probes; resolved 5+ hardware bugs and reduced testing time by **40%**.
- Coordinated with drivetrain, power, and controls teams to integrate **PCB design** into the EV system, ensuring stable motor communication during bench testing.

PROJECTS

Pipelined RISC-V CPU Core | *SystemVerilog, RTL Design, Vivado, FPGA*
- Designed a **5-stage pipelined RV32I CPU** with **3.8× throughput gain** vs. single-cycle baseline.
- Implemented **forwarding, hazard detection, and branch/JAL/JALR flush** achieving **1 CPI steady-state**.
- Built **modular pipeline registers** with precise control propagation enabling correct writeback and full RV32I support.
- Verified stalls, forwarding, and branch behavior using **Vivado XSim/EPWave** across **100+ directed/random tests**.
- Completed **FPGA synthesis and timing closure** on RealDigital Blackboard; validated resource and memory utilization.

Hardware-Accelerated Computer Vision Pipeline | *SystemVerilog, RTL, FPGA, VGA*
- Designed a **fully hardware-accelerated real-time computer vision pipeline** on FPGA capturing live OV7670 video and tracking brightest-region coordinates with dynamic VGA overlay.
- Built a **streaming downsample engine** from 640×480 to 32×32 reducing compute time by **99%** while sustaining real-time performance without frame buffering.
- Implemented **peak-detection hardware** using BRAM tensor storage to compute coordinates with minimal latency.
- Engineered **cross-clock domain synchronization** between camera PCLK and VGA timing ensuring stable video output and deterministic pipeline operation.
- Optimized datapath and memory architecture for **low-latency streaming processing** and efficient resource utilization.

Hardware Guitar Auto-Tuner | *Analog Circuit Design, Oscilloscope, Waveform Generator, CAD*
- Developed a fully **analog auto-tuning system** for guitar strings using op-amp gyrator circuits, high-Q band-pass filters, and peak detection.
- Designed frequency-selective **RLC filters** at 630 Hz, 660 Hz, and 690 Hz, achieving tuning accuracy within **2 Hz** and noise attenuation exceeding 40 dB.
- Implemented **comparator circuits** with peak detectors and an **H-bridge** motor driver to automatically adjust tuning pegs with mechanical rotation precision within **3 degrees**.

TECHNICAL SKILLS

Languages: Python, C++, C, Verilog, SystemVerilog, RISC-V, MATLAB, Assembly
Hardware Tools: Oscilloscope, Waveform Generator, Multimeter, FPGA, LTSpice, KiCad, Altium Designer, PCB Bring-Up, Soldering, Logic Analyzer, STM32CubeIDE, Fusion 360, I2C, SPI, CAN, UART
Software & Simulation: Vivado, EDA Playground, ModelSim, EPWave, Quartus Prime, LTSpice, Git, Linux CLI, LabVIEW