

Andrea Giuri

Stanford University, Stanford, 94305 | +1 (650) 441-7369 | andgiuri@stanford.edu | www.andreagiuri.com

EDUCATION

Electrical Engineering Major, Stanford University (4.1 GPA)

Graduating June 2028

- Current coursework (Fall 2026): Intro to VLSI Systems, Applied Quantum Mechanics I, Electromagnetic Waves
- Relevant coursework: Digital System Design, Computer Systems from the Ground Up, Embedded Systems, Signals and Systems, Electrodynamics, Probability, Partial Differential Equations, Linear Algebra, Mechanics and Special Relativity, Multivariable and Vector Calculus

EXPERIENCE

Research in Tambe Lab, Stanford: Designing Hardware Systems for Physical AI (μ VLA)

June 2026 - ongoing

- Working on a multi-chiplet system for fast VLA inference. Verified, optimized and integrated a HyperBus Controller with separate logic and phy clock in the SoCs. Used to interface with HyperRam and SemperFlash, and as Chip-to-Chip interconnect. Optimizations include burst chaining and read-ahead for sequential reads from flash, which let us skip HyperBus and AXI transaction overhead and achieve max theoretical bandwidth.
- Used VCS/DVE for full-system simulation and wrote C-based system-level tests to verify hardware in integration; co-designed hardware blocks with AI-generated SystemVerilog, and created an FPGA testbench for CDC primitives.
- Currently integrating an AI accelerator block developed using Catapult HLS into the SoC, future work will include compiling workloads for performance assessments on the entire multi-chiplet system.

Research in Dionne Lab, Stanford: Nanostructures for Raman Spectroscopy Enabled Wastewater-Based Epidemiology

Summer 2025 - Fall 2025

- Designed, parametrized and simulated (Lumerical FDTD) a fully conductive plasmonic metasurface with multiple resonances for bacteria detection, integrating Surface Enhanced Raman Spectroscopy with dielectrophoresis (DEP)
- Synthesized gold nanorods (AuNRs) and prototyped other SERS substrates; characterized substrates using AFM, SEM, and UV-VIS; developed a Raman data processing and visualization pipeline

Teaching Assistant and Section Leader for An Intro to Making: What is EE (ENGR 40M)

Spring 2025, Fall 2025

- Starting Freshman Spring, I lead a circuits lab, host office hours for class help, and write homeworks and exams

Research in Arbabian Lab, Stanford: Airborne Sonar

Spring 2025

- Analyzed and documented FPGA architecture for sonar-based surface mapping, preparing to scale from 128 to 500+ microphones. Gained further experience with Vivado, Vitis IDE, DDR, LwIP Raw API and AXI on-chip bus.

International Physics Olympiad

2023 - 2024

- Bronze medal at International Physics Olympiad in 2023
- Won gold medal, best overall exam and best theory exam at Italian Physics Olympiad in 2024, along with other national medals in Math and Chemistry.

PROJECTS

KVStream Attention + SoftMax hardware accelerator (Etched hackathon winner)

June 2026

- Created a hardware block using Vitis HLS to accelerate attention and softmax for transformer inference, reducing memory traffic by implementing streaming online softmax unit. Simulated design on professional FPGAs beat Nvidia H100 performance metrics, demo on small FPGA (PYNQ-Z2) performed distributed inference, where the MLPs were run on a host Macbook and the attention was run on the FPGA. <https://devpost.com/software/kvstream>

Baremetal Console and 8x8x8 Cube LED Display on RISC-V architecture (CS107e)

Winter 2026

- Worked up to creating a console on the MangoPi (Allwinner D1-H RISC-V SoC) in freestanding environment (no standard libs), implementing functions like printf and malloc, interrupt-base keyboard drivers, display drivers and graphics library.
- Created a 8x8x8 LED Cube controllable over SPI in a completely freestanding environment. Used shift registers for IO expansion, wrote fully custom baremetal drivers for the custom display and a 3D graphics library.

Sentinel: Full-stack AI for bare-metal embedded systems (TreeHacks 26 Best Hardware winner)February 2026

- Created Multi-Agent system with FPGA integration for closed-loop bare metal software development on embedded systems, with multiple agents testing on multiple Raspberry Pi 0 boards and PYNQ-Z2 FPGA monitoring the hardware pins to close the testing/debugging loop.
- The AI system built a 16000-line working baremetal OS with drivers like HDMI and Bluetooth, virtual memory and a complete shell, with minimal human input and in 24 hours. <https://devpost.com/software/sentinel-c8ki50>

Ethernet-based Lab Automation FrameworkFall 2025

- Built a STM32-based embedded control system networked over Ethernet (W5500 chipset) to remotely monitor and control laboratory equipment. Built a hot plate and a centrifuge to demo the framework.
- Developed real-time firmware using HAL/CubeMX, integrating DMA, I2C, SPI, UART, GPIO interrupts, timers, and PWM for sensor, display, and motor control. Implemented and tuned closed-loop PID control for temperature and motor speed, with Ethernet/UART telemetry for debugging and remote operation.

FPGA Music SynthesizerWinter 2025

- Designed a FPGA-based music synthesizer on PYNQ-Z2, supporting chords, harmonics, ADSR dynamics, stereo panning, reverb, multiple instrument voices and HDMI waveform output.
- Optimized real-time signal processing using fixed-point arithmetic, pipelined datapaths, shift-and-add and pipelined multiplication, and bit-width management to meet timing and resource constraints.

Time-Series Photometric Data Acquisition of Variable Stars2021 - 2022

- Conducted time-series photometric measurements of Beta Cephei and submitted results to AAVSO
- Designed custom control electronics and automated imaging setup, including mechanical and optical maintenance for precise data collection; scientific image calibration and processing in AstrolImageJ and SirIL

SKILLS

Programming	Verilog, SystemVerilog, C, C++, ARM and RISC-V Assembly, Python, MATLAB
Languages	Italian (native), English (fluent, TOEFL 114/120), Spanish (elementary)
Photography	Astrophotography, underwater photography, and travel photography
3D Modeling	Blender for rendering, and procedural materials, OnShape CAD
Music	Drums (rock and bossa nova, Yamaha Grade 6), Piano (Yamaha Grade 8)