

Andrea Giuri

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EDUCATION

Electrical Engineering Major, Stanford University (4.16 GPA)

Class of 2028

- Relevant coursework: Digital System Design, Computer Systems from the Ground Up, Embedded Systems, Partial Differential Equations, Linear Algebra, Mechanics and Special Relativity, Multivariable and Vector Calculus

EXPERIENCE

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

June 2025 - ongoing

- 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 in 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

Ethernet-based Lab Automation Framework

Fall 2025 - ongoing

- 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 Synthesizer

Winter 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 Stars

2021 - 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 AstrolmageJ and SiriL

SKILLS

Programming

Verilog, 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)