Nicolas Alarcon

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EDUCATION

Columbia University (New York, NY) – *B.S. Electrical Engineering & Computer Science, M.S. E.E.*
Sept. 2021 - May 2025, Sept 2024 - May 2026 | GPA: 4.08

- ***Honors:*** C.P. Davis Scholar, HSF Scholar, Tau Beta Pi, Dean's List, Student Excellence Award in Electronics
- ***Relevant Coursework:*** Microwave Circuits, VLSI, Computer Architectures, Embedded Systems, Robotics Studio, Digital Signal Processing, Analog Electronic Circuits, Analog Filters, Computer Networks
- ***Activities:*** Columbia Bartending Agency Instructor, NicoMakes Etsy Shop Owner, NASA L'Space Academy

EXPERIENCE

Thomas J. Watson Research Lab, IBM – *Quantum Hardware Engineering Intern*
May 2024 - August 2024| Yorktown Heights, NY

- Independently designed and executed a VNA Analysis Dashboard for decreasing time in diagnosing system failures utilizing statistical analysis techniques for comparison against historical data
- Mounted VNA Analysis Dashboard as secure Web Server for ease in large-scale analysis of 2-Port S-Parameters
- Developed Python device drivers for VNA and ZTM Switch Matrices to facilitate mass signal integrity analysis

Kampto Neurotech, Columbia University – *REU Student (June–August 2023), Research Assistant*
June 2023 - December 2025| New York, NY

- Spearheaded independent REU project to develop a framework for complex stimulation patterns in a neural interface system-on-chip at the FPGA level using Verilog, Python PYNQ interfaces, and Jupyter Notebook
- Reduced latency between neural stimulation pulses by over 90% using FPGA RTL and algorithm development

The Makerspace, Columbia University – *Superuser Volunteer (2022), Student Administrator*
March 2022 - Present | New York, NY

- Provide design consultations and assistance in manufacturing products for research and personal projects including a turntable, rocket/car parts, bags, high-resolution molds, electroplating, and architectural models
- Host project and training seminars in CAM/CAD in Fusion 360, Leather Belt Workshop, and Waterjet Jewelry
- Source and create documentation for new equipment including a kiln, blowtorch, wood lathe, and leather toolkit

PROJECTS

SystemVerilog RISC-V Out-of-Order Pentium6 Pipelined Processor

- Developed synthesizable, reduced-set RISCV-32I ISA processor handling both C and ASM benchmarks
- Featured 256B Dcache, non-blocking 256B prefetched Icache, split LSQ, two-bit branch predictor for 2x improvement on original design. All verification conducted via custom Verilog, Assembly and C testbenches.
- *Tools*: RISC-V, SystemVerilog, C, Make, Git, Bash, Linux

Beamforming Audio to Subtitle Augmented Reality Glasses

- Designed communication aid projecting real-time subtitles onto smart glasses using a microphone array.
- Received First Place in Electrical Engineering Senior Design Expo
- *Tools*: NLP, Analog Circuit/PCB Design, Matlab, Python, MCU Development, Raspberry Pi

CycloneV De1 SoC FPGA GameBoy Hardware Emulator

- Created a hardware emulator accurate to patented Nintendo schematics integrated within a larger IP with modern technological upgrades. Developed automated Verilator testbenches for incremental development.
- *Tools*: FPGA, SystemVerilog, Logic Design, Embedded Systems, C, C++, Quartus, Verilator, Linux

Cell Testing/Analysis Microfluidics FPGA Device, Columbia University Bioelectronics Systems Lab

- Developed device for classifying fluorescent cells via interfacing with a ADS54J66 ADC outputting data via USB
- *Tools*: FPGA, Verilog, Matlab, Logic Design, JESD204B/USB Protocol, Linux, Vivado, Xilinx

SKILLS & INTERESTS

- *Software:* Cadence, Spice, Fusion, KiCad, Python, Verilog, Java, Git, Matlab, C/C++, Linux, MS Office, AutoCAD
- *Technical:* Soldering, Circuit Analysis, Electronics, 3D Printing, Laser Cutting, Prototyping, PCB Manufacturing
- *Languages:* Spanish, French, English
- *Interests:* Volleyball, Art History, Bartending, Woodworking, Cooking, Fencing