

Philip Pincencia

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Education

University of California San Diego

September 2022 - June 2026

Bachelor of Science in Computer Engineering, Minor in Mathematics - 3.97/4.00 GPA

La Jolla, CA

- **Relevant Coursework:** Algorithm Design and Analysis, Advanced Data Structures, Computer Architecture, Digital Signal Processing, Random Processes, Abstract Algebra, Optimization, Digital Logic.

Experience

Software Engineer Intern

October 2024 – Present

Qualcomm Institute

La Jolla, CA

- Working on the audio processing algorithms for interactive website.

Signal Processing Chair

August 2024 – Present

IEEE@UCSD

La Jolla, CA

- Leading a team of 8 undergraduates to work on DeepFake Detection. Utilize DSP and Machine Learning to classify whether the image is real or computer-generated.
- Set up the whole team in NRP and uses **Kubernetes** for reliable storage.

Undergraduate Researcher

June – August 2024

Jacobs School of Engineering

La Jolla, CA

- Designed and Implemented a **Variable Order Markov Model** algorithm using a **Multiway Trie** in **Python** to analyze the temporal dynamics of melodic complexity in jazz solos.
- Processed raw chord changes from the WJazz Database using **C++** and **Regex**, reducing at least **50%** of time spent parsing data compared to manual labor.
- Researched and benchmarked 3 analysis methods, identifying the most suitable approach and developed ML algorithms to induce pitch probability distribution given harmonic context.

ECE Tutor

April 2024 – Present

Jacobs School of Engineering

La Jolla, CA

- Tutor undergraduate students in a **signals & systems and Probability class** and facilitated learning by proctoring quizzes and final exam, conducting weekly office hours, answering 200+ questions on the online class forum with an average response time of 5 minutes.
- Lead 5 **Quiz Reviews** to help prepare for the upcoming quiz by meticulously formatting the questions and drawing plots and circuits using LaTeX to resemble the true quiz style.

Projects

Spatial Audio Equalization with Active Noise Cancellation | *MatLab, LaTeX*

August 2024 - Present

- Developed a 3D spatial audio system using HRTF to spatialize audio for binaural listening, achieving accurate directional sound localization with ITD of up to 0.5 ms and ILD of 15 dB.
- Designed audio equalization using STFT, boosting low-frequency response by up to 15 dB and improving SNR by 12 dB, resulting in clearer bass effects.
- Developed an active noise cancellation system using the Normalized LMS algorithm, reducing background noise by up to 20 dB.

High-Frequency Trading Tick Data Compression | *C++, Python*

July - August 2024

- Implemented data compression using **Arithmetic encoding and decoding** given price, volume, and side, compressing the size to **0.59** the original with 95% accuracy.
- Reduced compression size by 3-5% through denoising and filtering with Haar Wavelet Transforms.

Floating Point and Cipher | *ARM Assembly, C*

February 2024

- Implemented **optimized bit masking** algorithm, function call, and branching in ARM 32 Assembly to convert from 15-bit Floating-Point format to IEEE-754 format.
- Constructed a full Assembly file encryption program by setting up a **stack frame** & handling function calls, converted C code into ARM that passes all 32 test cases after debugging using **gdb**.

Technical Skills

Languages: C/C++, Python, MATLAB, Java, ARM Assembly, SystemVerilog, Bash Script

Tools/Libraries: Git, gdb, VSCode, Vim, JUnit, LaTeX, Oscilloscope

Achievement

UCSD Integration Bee Top 8, World Mathematics Invitational Finalist, UNPAR Mathematics Competition Semifinalist