

Tyler Hattori

Audio Digital Signal Processing Engineer

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SUMMARY

Audio-focused Digital Signal Processing Engineer with an M.S. in Signal Processing and hands-on experience developing, optimizing, and deploying DSP algorithms for real-world systems. Strong background in audio analysis, filtering, spectral methods, and ML-assisted signal processing, with production experience using containerized pipelines, collaborative Git workflows, and testable codebases. Seeking to contribute advanced audio DSP solutions within modern film and media production environments.

CORE SKILLS

- **Audio DSP:** FIR/IIR Filtering, spectral analysis/synthesis, NLMS noise reduction, spatial audio and phased array processing, onset/pitch detection, LTI fundamentals, multirate processing and polyphase filter banks, autocorrelation applications
 - **Machine Learning:** Transformers, DNNs, CNNs, GANs, Embeddings, Attention
 - **Programming:** Python/PyTorch, MATLAB, Java/JavaScript, ROS, C++
 - **Audio Formatting:** WAV, MP3, AIFF, sample rates, quantization and bit rate effect on quality, DCT, psychoacoustics
 - **Engineering Practices:** Git/GitLab, Docker, Jira, unit testing, CI/CD concepts
 - **Math & Theory:** Linear algebra, Geometric Signal Theory, estimation, optimization
 - **Personal:** Guitar, Logic Pro, origami, watercolor
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PROFESSIONAL EXPERIENCE

Algorithm & Signal Processing Researcher

Systems & Technology Research – Boston | 2024–2025

- Developed and optimized large-scale DSP algorithms using advanced linear algebra techniques and unit testing, reducing computational complexity for array-based signal processing pipelines.
- Designed and containerized a full radar signal processing workflow using Docker, enabling reproducible builds and scalable deployment.
- Built custom simulators to generate labeled datasets for ML-driven signal processing experiments.

- Collaborated in multi-engineer environments using structured version control and documented pipelines suitable for production transition.
(*Secret Clearance*)

Capstone Electrical Engineering Teaching Assistant

University of California, Santa Barbara | 2023–2024

- Selected by faculty to mentor senior EE teams on robotic system architectures, DSP fundamentals, and implementation tradeoffs.
- Authored and standardized a ROS and signal-processing reference guide adopted across multiple teams for the following academic year.

Applications Engineer Intern

Monolithic Power Systems | Summer 2022

- Simulated, tested, and analyzed mixed-signal and power devices, delivering concise technical reports to senior engineers.
 - Gained experience translating lab results into actionable engineering decisions.
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AUDIO DSP PROJECTS (SELECTED)

Audio Signal Processing Sandbox (*Independent*) | 2025–Present

- Implemented adaptive noise cancellation using NLMS filtering, modeling techniques used in modern headphone systems.
- Designed mono-to-stereo spatialization for moving sources, incorporating frequency-dependent path loss and Doppler effects.
- Built sustained-note and pitch-stability extraction using RMS energy tracking and YIN-based pitch detection.
- Developed timbre replication via FFT magnitude ratio averaging across sustained notes.
- Ongoing work in source separation (NNMF), adaptive nonlinear amp modeling (distortion/compression), and algorithmic reverb using RT60/IIR filter estimation.

CTC Audio-to-Speech Recognition (CNN + Transformer) (*Independent*) | 2025

- Trained an end-to-end speech recognition system from scratch on LibriSpeech (360h clean).
- Achieved ~60% WER baseline, currently refining model architecture and preprocessing pipelines

Audio Quantization & MP3 Decoding Analysis

UC Santa Barbara | 2023

- Analyzed perceptual artifacts introduced by quantization, MDCT window length, masking thresholds, and bitrate variation across audio sources.
- Evaluated tradeoffs relevant to perceptual audio coding and media delivery workflows.

Audio Transcription to Guitar Fretboard with Key and Chord Classification (Transformer)

UC Santa Barbara | 2023

- Designed and optimized a full pipeline taking a WAV file as input and outputting probabilistic fretboard patterns and classifications to complete my M.S. degree.
 - Incorporated Transformer models trained on custom datasets and tokenization methods. Achieved >96% accuracy on all classification tasks.
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EDUCATION

M.S. in Signal Processing (Minor: Control)

University of California, Santa Barbara

GPA: 3.67 | Men's Club Ultimate | Completed 2024

B.S. in Electrical Engineering

University of California, Santa Barbara

GPA: 3.69 | Men's Club Ultimate | Completed 2023