

Adrian S. Roman

COMPUTER SCIENCE · APPLIED MATHEMATICS · AUDIO SOFTWARE ENGINEERING · MACHINE LISTENING

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Education

University of Southern California

M.S. IN ARTIFICIAL INTELLIGENCE

Los Angeles, CA

2023 - Present

University of California, Davis

B.S. IN COMPUTER SCIENCE & B.S. IN APPLIED MATHEMATICS

1 Shields Ave, Davis, CA

2016 - 2021

Stanford University

CERTIFICATE — INTENSIVE STUDIES IN DATA SCIENCE

450 Serra Mall, Stanford, CA

June - Aug 2018

Experience

Tesla

Page Mill Rd, Palo Alto, CA

SOFTWARE ENGINEER - CORE AUDIO SOFTWARE DEVELOPMENT

Dec 2021 - Present

- Developer of the vehicle chimes system; tuned the vehicle chimes system for CyberTruck and S3XY vehicles.
- Developed UI/firmware C++ code and AudioWeaver frameworks to enable the next generation adaptive chime mixing.
- Designed Python signal processing tests with hardware-in-the-loop automations to validate audio software development and releases.

SOFTWARE ENGINEER - MACHINE LEARNING FOR AUDIO

- Built sound event detection (SED) neural networks for real-time emergency vehicle detection.
- Developed a neural network to perform speech enhancement using time-frequency masks on custom microphone arrays.
- Carried out the fine-tuning of an automatic speech recognition (ASR) model including in-house data collection and curation efforts.

Tesla

3500 Deer Creek Rd, Palo Alto, CA

SOFTWARE ENGINEER INTERN

Apr - Dec 2021

- Designed and developed signal processing tests written in Python to ensure bit-perfect audio quality in DSP and TDM I/O.
- Developed speech simulations to benchmark word error rate (WER) on various closed- and open-source ASR models.
- Wrote a Qt in-vehicle audio diagnostics app to trigger various audio DSP functionalities. The app is used by hundreds of engineers and handles complex commands through a simple and intuitive UI. Minute 1:30 from this Tesla Youtube video shows a glimpse to my app.

Oscillo Biosciences

400 Farmington Ave, Farmington, CT

SOFTWARE ENGINEER INTERN

June 2019 - Mar 2020 & June - Sept 2020

- Optimized algorithm that runs a network with hundreds of nonlinear oscillators to perform beat tracking in music.
- Embedded algorithm in Synchrony™ LEDs to display synchronizing lighting patterns to the beat of music.
- Lead full-stack developer of the iOS app Adaptive Rhythmic Training (ART) that implements a rhythmic therapy for language pathologies.
- The app is planned to go on clinical trials for speech rehabilitation.

Publications

- **Roman, A. S.**, Roman, I. R., Bello, J. P. "Robust DOA estimation using deep acoustic imaging." 2024 ICASSP. arXiv pre-print:2401.08717
- **Roman, A. S.**, Balamurugan, B., Pothuganti, R. "Enhanced Sound Event Localization and Detection in Real 360-degree audio-visual Soundscapes" 2024. arXiv pre-print:2401.17129
- Roman, I. R., Ick, C., Ding, S., **Roman, A. S.**, McFee, B., Bello, J. P. "Spatial scaper: a library to simulate and augment soundscapes for sound event localization and detection in realistic rooms." 2024. ICASSP. arXiv pre-print:2401.12238
- Roman, I. R., **Roman, A. S.**, Kim, J. C., Large, E. W. "Hebbian learning with elasticity explains how the spontaneous motor tempo affects music performance synchronization." PLOS Computational Biology, 19(6), e1011154 (2023).

Presentations

CCRMA at Stanford

Stanford, CA

GUEST SPEAKER

Aug 2023

- Robust DOA estimation using deep acoustic imaging.

MARL at NYU

Online

GUEST SPEAKER

Apr 2023

- Sound localization feature extraction using a graph signal-processing model for acoustic imaging.

Society for Music Perception and Cognition (SMPC) Conference at NYU

New York, NY

ORAL PRESENTATION

Aug 2019

- Musician's Spontaneous Performance Rates Affect Interpersonal Synchronization in Joint Musical Performance: A Dynamical Systems Approach.

Programming

Programming Languages

Python, C/C++, BASH, MATLAB, ~~TeX~~

Tools/Frameworks

Git, Linux, PyTorch, SoX, QT.