

# Alex Tung

Research scientist specializing in spatial audio capture and acoustic simulation for soundfield characterization, room reverb, and electroacoustic design.

atung323@gmail.com | +1 858 603 2837 | alextungue.com

## Relevant Experience

### Senior Engineer, Spatial Audio and Electroacoustics Qualcomm Inc., Multimedia R&D Jun 2020 – Present

- Principal researcher for parametric spatial capture algorithms: developed soundfield capture libraries for parametric Ambisonic capture using irregular microphone arrays, conducted experiments for algorithm development.
  - Methods used: DirAC/SDM, metadata assisted spatial audio (MASA), PCA/ICA, DOA estimation, BEM-assisted compensation
- Principal researcher for spatial upmixing using neural audio codecs; led development and dataset generation.
- Simulation domain expert for parametric FEM+BEM modeling of HRTFs, device acoustics, and reverb characterization.
  - Led one project team, trained two project teams in multiphysics and simulation workflows using COMSOL
  - Extensive experience integrating multipoint laser vibrometry with acoustic/mechanical simulations
- Standards experience in 6DOF rendering techniques (MP-HOA, 6DOF reverb, SRIR). Named contributor in MPEG-I and IVAS.
- Experience directing listening tests and training subjects for MUSHRA, ITU-T BS.1199, ACR/DCR methodologies

### Graduate Researcher UC San Diego, Scripps Institution of Oceanography, Department of Music Nov 2019 – Present

- Researched sparse Bayesian techniques for volumetric soundfield estimation and reproduction (PI: Peter Gerstoft)
- Designed CAD revisions of a low-cost MEMS microphone array for first-order Ambisonic capture (PI: Gabriel Zalles)

### Research Intern, Electroacoustics Qualcomm Inc., Multimedia R&D Jun – Sep; 2018, 2019

- Characterized mechanical transduction and acoustic directivity of bending-mode panel transducers with BEM/FEM simulations, verified results on prototypes (Klippel LPM, multipoint SCN, NFS).
- Developed benchmarks on perceptual quality and vibrotactile sensation with laser- and accelerometer-based vibrometry. Experimental procedures published in 3GPP SA4 working group (HaNTE).

### Research Assistant, Audio Hardware Open Speech Platform (H. Garudadri), UC San Diego Aug 2017 – Feb 2018

- Measured acoustic performance of an end-to-end hearing aid system for open source audiometry; provided documentation for MEMS-based ear level assemblies to support collaborators from other universities.

## Other Experience

### Performance Coordinator, Spatial Audio SElectOr Concert Series, UC San Diego Feb 2020

- Assisted a graduate composer in spatialization of electronic pieces for rehearsal and performance: Encoded in 5th order Ambisonics and decoded for playback through modified Meyer Constellation system in the Conrad Prebys experimental theatre.

### Hackathon Finalist Best Spatial Audio Award (Bose Sponsorship), Qualcomm Intern Hackathon July 2019

- Created an interactive fitness game using Bose AR SDK to pass 6DOF IMU data to Google Resonance FOA renderer.

### Mentorship Coordinator ECE Undergraduate Council, Jacobs School of Engineering Sep 2017 – Jun 2018

- Organized and implemented a departmental mentorship program on behalf of the department of electrical and computer engineering. Secured funds for one-on-one mentorship meetings with local coffee shop, led small groups of student mentees for career guidance.

## Publications

- **Tung, Alex** and Gerstoft, Peter, "Multipole Source Capture using Multiple Dictionary Sparse Bayesian Learning," IEEE 58th Asilomar Conference on Signals, Systems, and Computers, 2024. (*accepted, not yet published*)
- **Tung, Alex** and Gerstoft, Peter, "Ambisonic Source Estimation using Sparse Bayesian Learning and Broadband Feature Selection," AES 5th International Conference on Audio for Virtual and Augmented Reality, 2024.
- **Tung, Alex**, Genovese, Andrea, Davis, Graham, and Schevciw, Andre, "Motion to Sound Latency Measurement for Black-Box Spatial Audio Renderers," AES 5th International Conference on Audio for Virtual and Augmented Reality, 2024.

## Education

### Electrical Engineering, M.S. University of California, San Diego Sep 2019 – Feb 2025

Research Topic: Bayesian compressive sensing for volumetric soundfield reproduction; papers accepted to AES and IEEE.

### Electrical Engineering, B.S., Computer Music minor University of California, San Diego Sep 2015 – Jun 2019

3.5/4.0 GPA; concentration in signal processing; jazz studies abroad.

### Software Skills

- Languages: MATLAB, Python, Julia, C++
- COMSOL Multiphysics
- Solidworks, Meshlab
- Max, Pure Data, Audition, Reaper, Audacity
- Other: Git SCM, Android audio backend

### Hardware Skills

- Audio Precision APx
- Brüel & Kjær acoustic and vibrometric measurement
- HEAD Acoustics measurement
- Klippel transducer measurement and multipoint laser vibrometry, force-velocity and lumped element transducer characterization
- Rapid prototyping for 3D printing and physics simulation

### Other Skills

- Teaching experience in acoustics, live sound, and music theory
- Vintage audio equipment and espresso machine restoration
- R&B guitar, bass, piano in one key

**Selected Coursework (\* graduate coursework):** Beamforming and Array Processing\*, Statistical Learning\*, Audio Programming, Psychoacoustics, Physical Acoustics\*, Transducer Characterization\*, FFT Techniques in Acoustics\*, FIR/IIR Filter Design\*, Stochastic Processes\*, Static Mechanics, Electromagnetism