

# Gabriel Zalles Ballivian

*Audio, media, education*

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## Education

- 2012–2016 **BA**, *UC San Diego*, La Jolla, *Bachelors*.  
Interdisciplinary Computing in the Arts Major
- 2016–2018 **MA**, *NYU*, New York, *Masters*.  
Music Technology
- 2018–2023 **PhD**, *UC San Diego*, La Jolla, *Doctorate*.  
Computer Music (expected)

## Master thesis

- Title *Design of a highly coincident microphone array for stereo and surround sound.*
- Supervisors Agnieszka Roginska
- Description Evaluated the effects of increased capsule coincidence in FOA recordings using state-of-the-art MEMS capsules. Objective measurements were obtained using a custom, Arduino powered, motorized microphone platform. Subjective assessments of the first order ambisonic array with extreme capsule coincidence were also conducted using a DIY head-tracker. The experiment sought to determine if improvements towards spatial aliasing can outweigh the SNR deficits of MEMS systems in FOA arrays. Statistical methods such as ANOVA were used to analyze results.

## Experience

### Professional

- 2023 **Birch Aquarium at Scripps - Artist in Residence**, *UCSD*, San Diego, California.
- In Summer 2023, I served as Birch Aquarium's 'Artist in Residence,' creating multimedia projects at the intersection of music and technology in a marine context. My key project, 'Talking with Fish,' remains a long-term installation, using fish movements to generate musical soundscapes. Additionally, I developed three other interactive interventions for exclusive patron events, employing Leap Motion controllers, Arduino, and MIDI interfaces. These projects aimed to engage, educate, and inspire visitors.

2022–2023 **GSR: Lei Liang and Whale Acoustics Laboratory, UCSD, San Diego, California.**

As a graduate student researcher under the supervision of composer Lei Liang, I coordinated and executed a live performance in cooperation with [ArtPower](#) at UCSD which was attended by hundreds of patrons. I also wrote a publication about the piece for the [TENOR](#) conference and collaborated with [Birch aquarium](#) on installations featuring supersonic sounds captured by the Whale Acoustics Laboratory at Scripps Institute of Oceanography. My last quarter I was also the TA for MUS7 by Nick Solem.

2022 **MUS7 Instructor of Record, UCSD, San Diego, California.**

During the summer session 2 at UCSD, I served as the instructor of record for MUS7 (Music, Media, and Technology), an introductory course focused on the history of computer music. I took the initiative to design this course from scratch, aiming to create an engaging learning experience. I offered the course in a hybrid format, accommodating approximately 20 students, and received valuable support from my TA, Erin Graham, throughout the teaching process. This experience allowed me to develop my teaching skills and design a curriculum that effectively conveyed the subject matter.

2021–2022 **Teaching Assistant, IT Support Specialist, and Sonic Arts Team Member, UC San Diego, San Diego, California.**

- Supported faculty members Shlomo Dubnov, Tamara Smyth, and Shahrokh Yadegari as a Teaching Assistant for courses MUS5, MUS171, and MUS176 (Spatial Audio).
- Assisted in designing course materials, conducting tutorials, and grading assignments and exams.
- Troubleshooted technical issues related to the Learning Management System (Canvas), video conferencing (Zoom), and other educational technologies.
- Collaborated with departmental IT personnel to keep software and systems up-to-date.
- Joined the Sonic Arts team in the spring quarter and actively contributed to Lei Liang's artistic projects.
- Worked collaboratively with the team to achieve artistic and technical excellence.

2020–2021 **Sound Design Summer Intern, Adobe, San Jose, California.**

As a member of Adobe's small audio team, I played a crucial role in designing and conducting psychoacoustic experiments. These experiments were conducted in collaboration with fellow employees who served as subjects. My primary focus was on evaluating various parameters of spatial audio within the context of narrative content. During my internship, I:

- Designed and executed multiple psychoacoustic experiments to assess the perceptual qualities of spatial audio in storytelling.
- Operated and managed remote servers using VPNs to ensure secure and efficient data collection during experiments.
- Analyzed and interpreted experimental data, providing insights into the effectiveness of different spatial audio techniques.
- Contributed to the development and refinement of spatial audio tools and technologies used in Adobe products.

- 2020–2021 **Technical/Teaching Support**, *UCSD*, La Jolla, California.
- Provided technical support and troubleshooting assistance for the Learning Management System (LMS) Canvas, ensuring smooth online course delivery.
  - Managed and resolved issues related to the videotelephony system Zoom, facilitating effective virtual instruction and collaboration.
  - Diagnosed and addressed network system problems associated with musical instruction, ensuring uninterrupted access to online resources.
  - Collaborated with faculty and students to resolve technical challenges, offering guidance and solutions to enhance the learning experience.
  - Contributed to the seamless operation of online educational platforms, enabling the successful transition to remote learning.
- 2019–2020 **Production Assistant**, *UCSD's Conrad Preby's Music Center*, La Jolla, California.
- Supported composers in incorporating computer music elements into their experimental theatre productions.
  - Provided expertise and guidance on spatial audio solutions, enhancing the immersive experience of the performances.
  - Organized and managed multiple concerts as part of the SElectOr series, featuring compositions that showcased collaborative work with graduate students Tiange Zhou and Qingqing Wang.
- 2018–2019 **Teaching Assistant**, *UCSD*, La Jolla, California.
- Assisted in the instruction of three undergraduate courses in computer music: Musical Acoustics, Computer Music I, and Computer Music II (**MUS 170/171/172**).
  - Provided support in teaching mathematics, acoustics, music theory, and programming concepts, with a focus on utilizing the Pure Data software environment.
  - Collaborated with course instructors to develop instructional materials and assignments.
  - Offered one-on-one tutoring to students, helping them grasp complex topics and improve their programming skills.
  - Assisted in grading assignments, exams, and coursework, providing constructive feedback to students.
- 2017–2018 **Research Assistant**, *NYU*, New York City, New York.
- Assisted with a THX research collaboration that evaluated binaural renderers used for spatial audio reproduction.
  - Updated and maintained a graphical user interface (GUI) written in MATLAB, which was instrumental in conducting a subjective study.
  - Collaborated with peers to write and submit peer-reviewed papers to AES (Audio Engineering Society) using  $\LaTeX$ .
- 2017–2018 **Teaching Assistant (DSP)**, *NYU*, New York City, New York.
- Taught students MATLAB and fundamental concepts of digital signal processing (DSP). Developed educational materials to support students in completing assignments. Offered personalized one-on-one tutoring and conducted grading for assignments and exams.
- 2017 **Studio Manager**, *NYU*, New York City, New York.
- Booked studio time for students and faculty.
  - Checked out music equipment.
  - Conducted daily inventory management.
  - Collaborated closely with maintenance and IT personnel to ensure software remained up-to-date and studio equipment functioned.

2016/2018 **AV Technician**, *UCSD*, San Diego, California.

Experience working as an audio-visual technician. The job involved setting up and striking audio and lighting equipment used for concerts, conferences, and other events. Daily tasks included live mixing, signal flow management, and lighting operation. Operated sound boards personally for the duration of events. Also, assisted with maintenance and repairs during the summer.

### Service

2020–2023 **GPSA Student Rep (Music)**, *UCSD*, La Jolla, California.

- Represented the music department within the Graduate and Professional Student Association (GPSA).
- Actively participated in the Diversity Advisory Council, promoting diversity and inclusion initiatives.
- Contributed to the Graduate and Family Housing Advisory Council, addressing housing-related concerns.
- Collaborated with UCAB (University Concerts and Events Board) on various campus events.
- Served as a liaison for the Union, facilitating communication between student organizations.

2020–2023 **Graduate Student Rep (Computer Music)**, *UCSD*, La Jolla, California.

I served as the Graduate Student Representative for computer music students within the music department at UCSD. In this role, I had the following responsibilities:

- Attended administrative meetings to represent the interests of computer music students.
- Effectively communicated pertinent information discussed in administrative meetings to my peers.
- Organized and facilitated events where I actively listened to concerns and complaints from fellow students.
- Advocated on behalf of students regarding various issues, including:
  - Ensuring access to department facilities for all students.
  - Assisting students in securing department grants for their projects.
  - Allocating funding to support students in attending and hosting conferences related to their field.

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### Awards

2022 **Summer Graduate Teaching Scholars**, *UCSD*, [Site](#).

MUS7 Summer Class, training with [TLC](#), course design workshop.

2022 **Preby's Grant**, *UCSD Music Dept.*, [Site](#).

Collaboration with UMSA in La Paz, teaching Pd in Spanish.

2020 **FIC Fitzsimmons Scholarship**, *UCSD FIC*, [Site](#).

Collaboration with Casataller, teaching Pd in Spanish.

2019 **Norman Design Fund Grant**, *UCSD Media Lab*, [Site](#).

For ambisonic microphone project.

2018 **CIE Institute Grant**, *NYU Leslie eLab JTerm Startup Sprint*, [Site](#).

For ambisonic microphone project.

2018 **Best Graduate Student Project**, *Steinhardt MTech Open House*, [Site](#).

For ambisonic microphone project.

- 2017 **Bronze Medal - AES Student Design Competition**, *AES 143*, [Site](#).  
For ambisonic microphone project.

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## Publications

Please find a complete list of publications on my [Google Scholar profile](#).

### Author

- 2019 **Audio Engineering Society 147**, Effects of Capsule Coincidence in FOA using MEMS: Objective Experiment, UCSD.  
Zalles
- 2018 **Master Thesis**, The Design of a Highly Coincident Microphone Array for Stereo and Surround Sound , NYU.  
Zalles
- 2017 **Audio Engineering Society 143**, A Low-Cost, High-Quality MEMS Ambisonic Microphone, NYU.  
Zalles et al.

### Co-author

- 2017 **Audio Engineering Society 143**, Evaluation of Binaural Renderers: A Methodology, NYU.  
Reardon et al.
- 2018 **Audio Engineering Society 144**, Evaluation of Binaural Renderers: Externalization, Front/Back and Up/Down Confusions, NYU.  
Reardon et al.
- 2018 **Audio Engineering Society 144**, Evaluation of Binaural Renderers: Localization, NYU.  
Reardon et al.
- 2018 **Audio Engineering Society AVAR**, Evaluation of Binaural Renderers: Multidimensional Sound Quality Assessment, NYU.  
Reardon et al.
- 2018 **Audio Engineering Society AVAR**, Acoustic perturbations in HRTFs measured on Mixed Reality Headsets, NYU.  
Genovese et al.

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## Selected Works

- 2022 **Alternate Spaces**, *Sound and Music Computing*, [SITE](#), Fixed-media.
- 2022 **Chaqu**, *NYC Electroacoustic Music Festival*, [SITE](#), Fixed-media.
- 2022 **DOAR**, *EarthDay Art Model*, [SITE](#), WebXR Experience.
- 2022 **Pigments of Imagination**, *DAVAMOT*, [SITE](#), WebXR Experience.

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## Workshops

2019 **Linux Audio Conference**, Making Ambisonic Plug-ins in JUCE, CCRMA Stanford University.  
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## Hackathons

2019 **SD Hacks 2019**, Leap Motion + MAX/MSP: Spectral|Spatial Audio Project, UCSD.  
Zalles

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## Programming Languages/Environments

Proficient Pd  
Fluent HTML, Objective-C  
Familiar C, Unix, JUCE, git

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## Courses Taken

Music Counter Point, Recording Arts, Puredata, Performance, Composition, MAX/MSP  
Math Linear Algebra, Calculus, Acoustics  
Programming Data Structures, Audio VST (C++), STM32 Course(C)  
Engineering Signal Processing, Analog Circuits  
Others Physical Modeling, CODEC design, Web Audio

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## Major Projects

Synthesesthesia VR Music Project for HTC Vive. As the project leader I provide the vision for the project and fill in any gaps that need to be filled. This project is part of UCSD's VR Club: TritonXR.

Ambisonic Microphone Ongoing project currently in the engineering phase. Currently working on a psycho-acoustic experiment for a first order ambisonic mic while building a second order ambisonic mic.

UCSD SElectOr Creative director of this musical project which tries to bring computer music students closer to composers and performers in collaborative experiments. My focus as creative director is spatial audio.

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## Organizations

AES Audio Engineering Society - published a handful of papers with this group.  
TritonXR A VR club at UCSD, I was a project lead for 2 years.  
UCSD SElectOr An unofficial club at UCSD I created for undergraduates to collaborate with graduates on art projects.

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## Interests

- Tennis** I have been playing tennis for over 10 years, I like to play both single and doubles. My favorite professional player is Juan Martin del Potro from Argentina.
- Books** My favorite genre of book is science-fiction. I also enjoy psychology books such as those by Dan Ariely.
- Music** When I am not listening to music I like to play guitar and make music on Ableton. I also enjoy experimenting with algorithmic composition and learning covers from my favorite bands.

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## Spoken Languages

- Spanish **Native**  
English **Fluent**  
French **Adept**

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## References

- Shahrokh Yadegari
- Miller Puckette
- Agnieszka Roginska
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