RYAN ZHANG

CONTACT INFO

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RESEARCH INTERESTS

My research interests are broadly in the intersection of Computer Science, Music, and Audio. More specifically I have been dealing with Human Computer-Interaction, Auditory Perception, Novel Interfaces, Music Theory, and Theoretical Computer Science. My research mission statement is **to utilize computing technology to enhance and better understand the sonic experience**. I am fulfilling this vision by creating new frameworks and creating perception experiments for **audio in mixed reality,** developing **new forms of musical experience/interaction**, and using complexity theory to better understand the relationship between **music and computation**.

RESEARCH EXPERIENCE

AUGMENTED PERCEPTION LABORATORY 2026-Present

CMU Human-Computer Interaction Institute | *Pittsburgh, USA*

- Spearheaded the design of novel audiovisual widgets within Extended Reality (XR) environments.
- Analyzed seminal literature on auditory cues and icons in order to come up with the next iteration for XR.
- Prototyped a new prompt-controlled synthesizer and audio generator to integrate with XR interfaces

AUDITORY LAB 2026-Present

CMU Psychology Department | *Pittsburgh, USA*

- Designed and executed experiments to measure spatial audio localization thresholds of the ventriloquist effect in virtual reality.
- Developed VR environments and auditory stimuli scripts in Unity to manipulate visual and spatial cues.
- Analyzed user localization data to understand multisensory perception; co-authoring upcoming November 2026 conference poster/abstract.

AUGMENTED PERCEPTION LABORATORY 2025-2026

CMU Human-Computer Interaction Institute | *Pittsburgh, USA*

- Investigated adaptive soundtrack systems and personal music paradigms.
- Implemented prototypes to study music adaptation to user context.

EDUCATION

Bachelors of Computer Science and Arts (Music Technology Concentration) 2024-2028

Carnegie Mellon University | *Pittsburgh, United States of America*

- Dean's List
- Audiovisual Engineer for School of Music
- Sound Designer for Lunar Gala

ACHIEVEMENTS

Awards

- APCAM 2026 Accepted Poster
- BXA Small Grant 2026
- CMU Small Undergraduate Research Grant Fall 2026
- CMU Summer Undergraduate Research Fellowship 2026
- Dean's List
- TartanHacks 3rd Overall Place Project

PROJECTS

VOICE-CONTROLLED SYNTHESIZER 2026

- Proposed to replace the keyboard control of a physical synthesizer instrument with voice control
- Collaborated with Electrical Engineering students to prototype design
- Brainstormed methods of new intuitive instrument controls for the hands

HAND MUSIC, HACKATHON PROJECT 2025

- Created a hand gesture controlled musical instrument detecting hand activity using computer vision
- Mapped intuitive gestures to paramter and effect controls
- Developed novel harmonization system
- Won 3rd place at largest hackathon with 700 participants in Pittsburgh, TartanHacks

SKILLS

Coding Python, C#, Javascript, SML

Technologies Unity, Git, Meta Quest, Vim, Pro Tools, FL Studio

Languages

- English (native)
- Chinese (professional proficiency)
- Swedish (elementary proficiency)