Zhiyu Alex Zhang

@ zhiyuzha@umich.edu | ☐ Personal Website | ⌂ GitHub | ♫ Music Portfolio | ⚲ Ann Arbor, MI

EDUCATION

University of Michigan Ann Arbor, MI
*B.S. in Computer Science (Dual Degree); **Current GPA: 3.96/4.00*** *Jan 2022 – May 2025 (Expected)*
*B.A. with Music Concentration (Dual Degree); **Current GPA: 3.96/4.00*** *Sep 2023 – May 2025 (Expected)*

Wake Forest University Winston-Salem, NC
Cumulative GPA: 4.00/4.00 *Sep 2020 – Dec 2021*

RESEARCH EXPERIENCE

Deep Drawing Ann Arbor, MI
Faculty Advisors: Prof. John Granzow, Prof. Julie Zhu *Jan 2023 – Present*

- Pioneered an AI co-performer capable of transforming the subtle sounds of hand drawing into aesthetic video representations, effectively embodying the auditory intricacies of drawing with pen and paper on a digital canvas.
- Led the implementation of a specialized Long Short-Term Memory (LSTM) Recurrent Neural Network (RNN) architecture that translates 4 channels of high-quality audio signals into a precise sequence of pen position metadata.
- Designed a visually compelling JavaScript interface, transforming pen position metadata into dynamic visualizations that allow for real-time interaction with the evolving artwork.

Visualizing Telematic Music Performance Ann Arbor, MI
Faculty Advisors: Prof. Michael Gurevich, Prof. John Granzow, Prof. Brent Gillespie *Jan 2023 – Present*

- Explored novel methods to replace traditional video transmission of music performance with digitally fabricated mechatronic displays that capture and convey musicians' gestures, hence transforming the landscape of remote musical collaboration and performer-audience interaction.
- Conducted literature review and designed pilot studies that examine the effectiveness of human-computer interaction within the project's avatar system through public performances, performer interviews, and audience surveys.
- Captured Electromyography (EMG) data from musicians' body movements with Qualisys, refined the mapping between performers' Automatic Identification of Markers (AIM) models and mechatronic displays' movements, and processed motion data transfer between embedded and host computers with Max/MSP.

Ethnomusicology Research on Chinese Musical Instruments Winston-Salem, NC
Faculty Advisor: Prof. Stewart Carter *Oct 2021 – Present*

- Performed an in-depth investigation on Chinese musical instruments in the *Ming* and *Qing* dynasties, gathering diverse sources of evidence, primarily consisting of artifact pictures, historical manuscripts, and music theory treatises.
- Critically analyzed instrument characteristics and parameters documented in classical Chinese, rendering them into English and thus contributing to the understanding of Chinese organology's cultural significance.
- Created and maintained comprehensive documents that facilitate quick search capabilities and easy access to information on Chinese instruments, thereby remarkably enhancing research productivity, data organization, and knowledge accessibility.

WORK EXPERIENCE

SoundBug Shanghai, China
Software Engineer Intern *Jun 2023 – Aug 2023*

- Developed a 5-band Equalizer AU/VST plugin with C++ and the JUCE framework as an upgrade to the current stock Equalizer plugin in SoundBug, an educational Digital Audio Workstation (DAW).
- Designed an elegant user interface featuring low cut, low shelf, parametric, high shelf, and high cut filters accompanied by a Fast Fourier Transform (FFT) spectrum analyzer and bypass buttons to enhance user control over mixing and mastering.
- Integrated a user-friendly control system for adjusting filter parameters, including advanced options such as frequency cutoff, Q factor, filter gain, and filter slope.

MicroPort NaviBot
R&D Intern

Remote

Jun 2022 – Aug 2022

- Prototyped an open library of knee, hip, and ankle implants for the SkyWalker/Honghu robot-assisted surgical system to perform Total Knee Arthroplasty (TKA), Total Hip Arthroplasty (THA), and Total Ankle Replacement (TAR) with prostheses produced by any manufacturer, significantly augmenting the system's commercial value.
- Conceived 15+ UI designs and a high-fidelity wireframe with Axure RP, offering surgeons an intuitive view of the functionalities in the upgraded open library.
- Spearheaded a proposal to automate anatomy-specific CT/fMRI image segmentation and landmark registration, leveraging the potential of machine learning to improve system efficiency by approximately 50 times.

Freelance Translator

Remote

Jan 2018 – Present

- Shanghai Education Press House (Apr 2023 – Present): Currently leading the translation of *Assessment in Music Education* by Martin Fauley into Chinese.
- Shanghai Conservatory of Music Press (Jan 2018 – Jun 2018): Translated *The Choral World: A Chronological, Historical, and Geographical Approach* by Christian Ljunggren into Chinese.
- Delivered precise translations, conducted detailed proofreading, and ensured adherence to strict formatting guidelines in various literary projects.

SELECTED WORKS

Publications

Zhang, Z. 2019. *Alex's Musical Picture Book*. East China Normal University Press. (ISBN: 978-7-5675-9374-9)

Translations

Ljunggren, C. 2018. *The Choral World: A Chronological, Historical, and Geographical Approach*. Translated from English by Wang, Y. and **Z. Zhang**. Shanghai Conservatory of Music Press. (ISBN: 978-7-5566-0171-4)

Invited Talks and Presentations

May 2024. The 53rd Annual Meeting of the American Musical Instrument Society (AMIS). "Music, Instruments, and Dance in Tenth-Century Shu: Echoes of the Great Tang". (Accepted as Poster Presentation)

June 2023. The 52nd Annual Meeting of the American Musical Instrument Society (AMIS). "Kangxi, Father Amiot, and 'Improvements' to Ritual Instruments in Eighteenth-Century China". (Presentation)

Media Production

"Grandpa Cao and His Angels". 2018. Produced by Yu, D. and **Z. Zhang** for the Music Education in China (MEiC) series at the Shanghai Conservatory of Music Press. A documentary episode raising awareness about Autism Spectrum Disorder (ASD), it reached an estimated audience of 1,000,000 viewers on Shanghai's public transportation system.

AWARDS & HONORS

The William E. Gribbon Memorial Award for Student Travel at the American Musical Instrument Society (AMIS): 2023 ($2600)

James B. Angell Scholar at the University of Michigan: Winter 2022

University Honors at the University of Michigan: Winter 2022, Fall 2022, Winter 2023, Fall 2023

Dean's List at Wake Forest University: Fall 2020, Spring 2021, Fall 2021

SKILLS

Technical Programming Languages: C++, Python, JavaScript, HTML, CSS, R, SQLite

Technical Libraries and Frameworks: PyTorch, Numpy, Scikit-Learn, JUCE, Flask, React

Creative Programming Languages: Faust, Max/MSP, Processing

Audio Software: Logic Pro, FL Studio

Computer-Aided Design (CAD) Software: Rhinoceros 3D, OpenSCAD, Fusion 360

UX Prototyping Software: Axure RP

Relevant Coursework

Computer Science Courses: Machine Learning for Natural Language Processing, Computer Vision, Information Retrieval, Web Systems, Accessible Computing, Data Structures and Algorithms, Linear Algebra

Music Courses: Digital Fabrication for Acoustics, Computer Music, Creative Coding, Introduction to Electronic Music Production, Introduction to Musical Analysis

References

Prof. John Granzow, Associate Professor of Music
University of Michigan
+1 (734) 764-3751, jgranzow@umich.edu

Prof. Stewart Carter, Professor of Music
Wake Forest University
+1 (336) 758-5106, carter@wfu.edu

Prof. Danhong Yu, Professor of Music Education
Shanghai Conservatory of Music
+86 139-1872-6918, yudanhong@shcmusic.edu.cn