Weixi Zhai

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Education

Quanzhou Normal University **China**
Master of Arts in Music *2023.9 - 2026.6*
Supervisor: Prof. Jianbing Xiahou
- Dissertation: Deep Learning Based Music Generation on Nanyin Musical Features
  – Nanyin is a UNESCO-recognized traditional Chinese music genre

China West Normal University **China**
Bachelor of Science in Communication Engineering *2017 - 2021*
- Coursework: Signals and Systems, Digital Signal Processing, DSP Techniques and Applications

Publications

[paper] [github] **MAJEPPA: Morphing and Assessing in a Unified Piano Performance Space**
ISMIR 2026 – 27th International Society for Music Information Retrieval Conference.
Nominated for the Best Paper Award.
Authors: Jinwen Zhou, Huan Zhang, **Weixi Zhai**, Jinhua Liang, Aidan Hogg, Simon Dixon.
• Developed a self-supervised framework learning piano performance representations across the full skill spectrum.

[paper] [github] **Oral Tradition-Encoded NanyinHGNN: Integrating Nanyin Music Preservation and Generation through a Pipa-Centric Dataset**
CSMT 2025 – 12th National Conference on Sound and Music Technology (Hohhot, China).
Authors: Jianbing Xiahou, **Weixi Zhai**, Xu Cui.
• Modelled heterophonic interaction in Nanyin ensembles via a heterogeneous graph neural network; contributed to dataset construction and model training.

[paper] [github] **Blaming the Algorithm: An Analysis of Interpolation Failures in MusicVAE's Latent Space**
3rd Workshop on Human-Centric Music Information Research (HCMIR@ISMIR), 2025 (Daejeon, South Korea).
Author: **Weixi Zhai**.
• Investigated perceptual discontinuities in MusicVAE interpolation through failure-case analysis and latent-space visualisation.

[paper] [demo] **Leveraging PerTok and Domain-Specific Transformer Design for Expressive MIDI Ornament Generation**
ISMIR 2025 Late-Breaking/Demo (Daejeon, South Korea).
Author: **Weixi Zhai**.
• Developed a transformer-based system for expressive ornament generation using PerTok tokenisation and syntax-constrained sampling.

[paper] [github] **Weak Tokenization: A Preliminary Study of Dynamic Audio Chunking for Irregular Music Generation**
ISMIR 2025 Workshop on LLM4Music, 2025 (Daejeon, South Korea).
Author: **Weixi Zhai**.
• Proposed a dynamic chunking strategy for non-isochronous music generation and variable-length token representation.

Research

AI-Based Music Generation on Nanyin Music(Project No. FJ2023JDZ050) ongoing
Supervised by Prof. Jianbing Xiahou
- Proposed an AI model for Nanyin music integrating representation learning and generative composition to address scarcity of traditional works and support analysis, creative generation, and cultural preservation.
- Constructed a Pipa-centric dataset and leveraged a Heterogeneous Graph Neural Network (HGNN) to reconstruct heterophonic accompaniments in Nanyin music.

Workshops & Academic Engagements

Digital Score Solutions in the Context of Artificial Intelligence Technology Nov 2024 – Jun 2025
DigiScore Lab, Central Conservatory of Music (Mentored by Prof. Kenneth Fields)

- Proposed *Good or Bad: Real-Time Interpolated DigiScore*, a concept examining how performers might use a real-time interpolation slider (via Magenta's MusicVAE) to navigate between "good" and "glitch" materials and render algorithmic decisions as playable interactions.
- Participated in online discussions with Prof. Kenneth Fields and peers, joined the thematic seminar on AI-based digital notation, observed others' case presentations, and took part in the final group discussion.

Marginalized Music Genres and AI Music Generation Jan 2024
Tsinghua University–Tsingshang Joint Institute for Smart Scene Innovation Design (Hosted by Prof. Nick Bryan-Kinns)

- Participated in a cross-disciplinary workshop examining how interaction design and AI can support underrepresented musical traditions, emphasizing sustainable and equitable approaches to generative modeling.
- Contributed perspectives on ethical dataset construction, cultural preservation, and reimagining AI as a creative partner that recontextualizes—rather than homogenizes—marginalized music cultures.

Certificates

AI for Creative Work (Specialization) — University of Michigan / Coursera [PDF] Oct 2025
Courses: AI Basics and Tools for Creativity; AI Ethics, Responsible Use, and Creativity; Using AI to Expand Creativity

Live Performance Systems

[video] [report] **RenCon 2025: Expressive Piano Performance Rendering Contest** *ISMIR 2025, Daejeon, South Korea*
Finalist & System Developer — ScorePerLock *Sep 2025*
Developed an expressive piano rendering model that generates human-like performances from symbolic scores through learned phrasing, dynamics, and timing cues. In the live concert session, 9 performances (8 algorithmic systems and 1 human reference) were presented for anonymized audience evaluation on a **Yamaha Disklavier**, with listeners rating each rendition and identifying the human performer.

Interactive Performance Works

[video] **Real-Time Timbral Explorations: A Visual Journey Through MIR Algorithms** *2025*
Developed an interactive performance system integrating MIR algorithms as the core compositional mechanism. The system explores timbre-based sound generation through mathematical spiral trajectories (Archimedes, Logarithmic, Fermat) in multidimensional timbre spaces, utilizing real-time MFCC analysis, k-NN interpolation, and granular synthesis with visual interface displaying algorithmic states and sonic transformations.

Skills

Programming: Python, PyTorch, TensorFlow, Librosa, MATLAB, LaTeX
Libraries: NumPy, Essentia
Design & Deployment Tools: Gradio (interactive demos), Render (web deployment), TouchDesigner
Audio & Interactive Systems: Max/MSP
Audio Production: Cubase