Ziyu Wang

Email: ziyu.wang@nyu.edu
Tel: +1(551)-247-9045
Github: github.com/ZZWaang

ACADEMIC EXPERIENCE

Research Interests

Music Generation, Interpretable AI, Self-Supervised Representation Learning, Foundation Models

Education

Jun 2019–Present	**New York University**, New York, United States **Ph.D. Candidate**, Computer Science — Thesis topic: Structural Interpretability for Deep Music Generation — Advisor: Prof. Gus G. Xia — Thesis Committee: Prof. Gus G. Xia, Prof. Yann LeCun, Prof. Roger Dannenberg, Prof. Eric Xing, Prof. Cheng-Zhi Anna Huang
Sep 2014–May 2019	**Fudan University**, Shanghai, China **B.S.**, Mathematics and Applied Mathematics

Research Experience

Jun 2022–Present	**MBZUAI**, Abu Dhabi, UAE **Research Assistant** in Machine Learning — Advisor: Prof. Gus G. Xia
Dec 2017–May 2019	**NYU Shanghai**, Shanghai, China **Research Assistant** in Machine Learning — Advisor: Prof. Gus G. Xia

PUBLICATIONS

2025	J. Zhao, G. Xia, **Z. Wang**, Y. Wang, "Structured Multi-Track Accompaniment Arrangement via Style Prior Modelling", Submitted to *38th Conference on Neural Information Processing Systems (NeurIPS)*. Accepted. 2025.
	Y. Wu, **Z. Wang**, G. Xia, B.Raj, "Emergent Interpretable Symbols and Content-Style Disentanglement via Variance-Invariance Constraints", Submitted to *38th Conference on Neural Information Processing Systems (NeurIPS)*. Submitted. 2025.
	L. Ou, J. Zhao, **Z. Wang**, G. Xia, Y. Wang, "Unlocking Potential in Pre-Trained Music Language Models for Versatile Multi-Track Music Arrangement", Submitted to *The 39th Conference on Artificial Intelligence (AAAI)*. Submitted. 2025.
2024	**Z. Wang**, L. Min, G. Xia, "Whole-Song Hierarchical Generation of Symbolic Music Using Cascaded Diffusion Models", in *Proceedings of the 12th International Conference on Learning Representations (ICLR)*. Austria, May 2024.
	K. Fang, **Z. Wang**, G. Xia, I. Fujinaga , "Exploring GPT's Ability as a Judge in Music Understanding", Submitted to *25th International Society for Music Information Retrieval Conference (ISMIR)*. Accepted. 2024.
	Z. Wang, Y. Wu, G. Xia, R. Dannenberg, "Automatic Melody Reduction via Shortest Path Finding", Submitted to *25th International Society for Music Information Retrieval Conference (ISMIR)*. Submitted. 2024.

Y. Ma, *et al.*, including **Z. Wang**, "Foundation Models for Music: A Survey.", *arXiv preprint*, arXiv:2408.14340v2 [cs.SD], August 2024.

R. Yuan, *et al.*, including **Z. Wang**, "ChatMusician: Understanding and Generating Music Intrinsically with LLM.", in *Findings of the Association for Computational Linguistics (ACL)*. 2024

2023   S. Wei, **Z. Wang**, W. Gao, G. Xia, "Controllable Music Inpainting With Mixed-level and Disentangled Representation", in *Proceedings of 48th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. Greece, Jun 2023

2022   Y. Qu, Y. Qin, L. Chao, H, Qian, **Z. Wang**, and G. Xia, "Modeling Perceptual Loudness of Piano Tone: Theory and Applications", in *Proceedings of the 23rd International Society for Music Information Retrieval Conference (ISMIR)*. India, Dec 2022.

Z. Wang, D. Xu, G. Xia, and Y. Shan, "Audio-To-Symbolic Arrangement Via Cross-Modal Music Representation Learning", in *Proceedings of 47th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. Singapore and online, May 2022.

2021   **Z. Wang**, and G. Xia, "MuseBERT: Pre-training of Music Representation for Music Understanding and Controllable Generation", in *Proceedings of the 22nd International Society for Music Information Retrieval Conference (ISMIR)*. Online, Nov 2021.

2020   **Z. Wang**, D. Wang, Y. Zhang and G. Xia, "Learning Interpretable Representation for Controllable Polyphonic Music Generation", in *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR)*, Canada and online, Nov 2020.

Z. Wang, Y. Zhang, Y. X. Zhang, J. Jiang, J. Zhao and G. Xia, "PianoTree VAE: Structured Representation Learning for Polyphonic Music", in *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR)*, Canada and online, Nov 2020.

Z. Wang, K. Chen, Y.Zhang, J. Jiang, M. Xu, S. Dai and G. Xia, "POP909: A Pop-Song Dataset for Music Arrangement Generation", in *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR)*, Canada and online, Nov 2020.

Y. Zhang, **Z. Wang**, D. Wang, G. Xia, "BUTTER: A Representation Learning Framework for Bi-directional Music-Sentence Retrieval and Generation", in *Proceedings of the 1st Workshop on NLP for Music and Audio (NLP4MusA)*. Online, Nov 2020.

2019   R. Yang, D. Wang, **Z. Wang**, T. Chen, J. Jiang and G. Xia, "Deep Music Analogy Via Latent Representation Disentanglement", in *Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR)*, The Netherlands, November 2019.

M. Xu, **Z. Wang** and G. Xia, "Transferring Piano Performance Control Across Environments", in *Proceedings of the 44th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. United Kingdom, May 2019.

2018   **Z. Wang** and G. Xia, "A Framework for Automated Pop-song Melody Generation and Piano Accompaniment Arrangement", in *Proceedings of the 6th Conference on Sound and Music Technology*. China, Nov 2018.

TEACHING EXPERIENCE

Course Teaching

Spring 2024   **ML711: Intermediate Music AI**, MBZUAI
Lab instructor/teaching assistant
— Instructor: Prof. Gus G. Xia

Fall 2023	**ML701: Introduction to Machine Learning**, MBZUAI Guest lecturer/lab instructor/teaching assistant — **Guest lecture**: Hierarchical Generation in Deep Learning — Instructor: Prof. Samuel Horvath
Fall 2018, 2020-2021	**CSCI-SHU 188: Introduction to Computer Music**, NYU Shanghai Guest lecturer/lab instructor/teaching assistant — **Guest lecture**: Semantics of symbolic music, Deep Music Generation (2021) — **Guest lecture**: MIDI & music notation (2020) — **Guest lecture**: Algorithmic music composition (2018) — Instructor: Prof. Gus G. Xia
Fall 2020	**SHBI-GB 7310: Advanced Topics in Machine Learning**, NYU Shanghai Lab instructor/teaching assistant — Instructor: Prof. Ming Liao

Student Mentoring

Apr 2024–Present	Rikhat Akizhanov, Master student at MBZUAI **Project:** A unified approach for hierarchical representation learning and generation
Apr 2024–Present	Nuren Zhaksylyk, Master student at MBZUAI **Project:** A unified approach for hierarchical representation learning and generation
Apr 2024–Present	Vladislav Mitkin, Master student at MBZUAI **Project:** A unified approach for hierarchical representation learning and generation
Mar 2024–Present	Chenxi Bao, Master student at University of Edinburgh **Project:** Expressive performance rendering with diffusion models
Mar 2024–Present	Qi He, Master student at National University of Singapore **Project:** Whole-song music generation with hierarchical motif control
Apr 2022–Present	Kun Fang, Research assistant at MBZUAI **Project:** Symbolic beat tracking & prompt engineering for music understanding
Jun 2021–Aug 2023	Yutian Qin, Master student at Carnegie Mellon University **Project**: Modeling perceptual loudness of piano tone
Sep 2020–Aug 2023	Yang Qu, Master student at UC San Diego **Project**: Modeling perceptual loudness of piano tone
Dec 2021–Aug 2023	Hangkai Qian, Undergraduate student at NYU Shanghai **Project**: Modeling perceptual loudness of piano tone
Sep 2021–Sep 2022	Alan Lecheng Chao, Undergraduate student at NYU Shanghai **Project**: Modeling perceptual loudness of piano tone
Jun 2019–Aug 2021	Leyi Sun, Undergraduate student at NYU Shanghai **Project**: Performance control transfer via player pianos
Jun 2019–Aug 2021	Ningran Song, Undergraduate student at NYU Shanghai **Project**: Performance control transfer via player pianos

INDUSTRY EXPERIENCE

Jul 2024–Sep 2024	**Research Intern**, Music Foundation Model Team, Sony Research **Project:** empowering LLMs with hierarchical generation capabilities — Advisor: Dr. Wei-Hsiang Liao and Yukara Ikemiya

Jun 2022–Aug 2022	**Research Intern**, Research & Development Division, Yamaha **Project:** symbolic score quantization and beat tracking — Mentor: Dr. Akira Maezawa
Jul 2021–Oct 2021	**Research Intern**, ARC Lab, Tencent PCG **Project:** audio-to-symbolic music arrangement — Mentor: Dr. Shan Ying

MUSIC EXPERIENCE

Piano

Feb 2024	**Music AI Concert:** Leia Zhu, Violin Prodigy Visits MBZUAI **Piano accompanist & music AI technician** Visitors Center, MBZUAI, Abu Dhabi, UAE
May 2023	**Project:** "Sing For Hope" public performance **Impromptu performance** of Bach's *Goldberg Variations* The Oculus at the World Trade Center, New York, United States
July 2022	**Music AI Concert:** Music from Far Lands and Near Future **Piano solo, accompanist, & music AI technician** House of Pianos Concert Hall, Dubai, UAE
May 2021	**Concert:** Symphonic Dances: End of Semester Piano Duo Concert **Piano duo** with Prof. Meiling Chen, Rachmaninoff's *Suite No. 2, Op. 17* NYU Shanghai, Shanghai, China

Orchestra

Dec 2017–Aug 2018	**Assistant Conductor**, Rainbow Chamber Orchestra, Shanghai, China **Performances:** Dances (*Rumanian folk dances*) & Operas (*Voi lo sapete, o mamma, Quando m'en vo'*) **Rehearsals:** Selected symphonies and piano concerti by Mozart & Beethoven
Sep 2014–Aug 2016	**Chief Performer**, Fudan Chinese Music Orchestra, Shanghai, China *Gaohu, Erhu, Zhonghu player, and soloist*

Musical Theater

Sep 2018–May 2019	**Music Consultant** of *Dear Evan Hansen* Fudan Musical, Fudan University, Shanghai, China
Sep 2017–May 2018	**Music Director/Conductor** of *Chicago* Fudan Musical, Fudan University, Shanghai, China
Feb 2017–Nov 2017	**Director/Music Director/Conductor** of *Into the Woods* Fudan Musical, Fudan University, Shanghai, China
Sep 2016–May 2017	**Music Director/Conductor/1st Keyboard** of *Avenue Q* (in Mandarin) Fudan Musical, Fudan University, Shanghai, China
Feb 2016–Nov 2016	**Director/Music Director/Conductor** of *MAMMA MIA!* Fudan Musical, Fudan University, Shanghai, China

Chorus

2014–2016, 2020–2021	**Conductor**, Student Chorus of the Math Department, Fudan University Fudan Musical, Fudan University

Jazz Ensemble

Sep 2020–March 2022   **Conductor & Pianist**, NYU Shanghai Jazz Ensemble
End of semester concerts (Fall 2020, [Spring 2021](#), Fall 2021)
Advisor: Prof. Murray James Morrison

ACADEMIC PROJECTS

Graduate Research Project

Sep 2023–Present   **Project: Self-Supervised Content and Style Disentanglement**
Music X Lab, MBZUAI
- Designed a regularization method based on content-style variance and invariance.
- Designed self-supervised model for pitch-timbre disentanglement.

Jan 2021–Present   **Project: Hierarchical and Structural Music Generation**
Music X Lab, NYU Shanghai & MBZUAI
- Designed MuseBERT and PianoTree VAE to learn non-sequential music dependency.
- Designed latent space Language Model for long-term flexible music inpainting.
- Designed music compositional hierarchy for cascaded whole-song generation.

Feb 2019–Present   **Project: Music Representation Learning**
Music X Lab, NYU Shanghai & MBZUAI
- Designed EC^2-VAE for monophonic representation disentanglement.
- Designed Poly-dis for polyphonic representation disentanglement.
- Designed BUTTER for text-to-music generation based on cross-modal representations.
- Designed an Audio-to-symbolic arrangement model based on audio representations.

May 2018–Present   **Project: Music Understanding via Computation**
Yamaha & Music X Lab
- Collected POP909 dataset for MIR research.
- Fine-tuned MuseBERT to achieve chord recognition and score quantization.
- Designed Tonal Reduction Algorithm to extract a reduction of a lead melody.

Apr 2019–Aug 2023   **Project: Performance Control Transfer of Player Pianos**
Music X Lab, NYU Shanghai & MBZUAI
- Measureed equal-loudness curve of piano tone.
- Proposed loudness model of piano tone under machine learning approach.
- Proposed performance control transfer algorithm based on sound environment.

Undergraduate Research Project

Dec 2017–Jun 2018   **Project: Rule-based Automatic Composition System**
Music X Lab, NYU Shanghai & MBZUAI
- Proposed melody generation algorithms based on pitch contour decomposition.
- Proposed rule-based arrangement algorithms comparable to deep learning models.

Jan 2018–Jun 2018   **Project: Analyzing Angle-Based Multicategory Support Vector Machines**
Undergraduate Thesis, Advisor: Prof. Lei Shi, Fudan University, Shanghai
- Designed a kernel method for angle-based MSVM classifiers.

INVITED TALKS

Jun 2024   **Topic:** Music Style Transfer via Representation Learning
Nanjing University of the Arts, Nanjing, China

May 2024   **Topic:** Learning Interpretable Concepts for Music AI
Hong Kong University of Science and Technology (Guangzhou), Guangzhou, China

May 2024   **Topic:** Learning Interpretable Concepts for Music AI

Institute of Computational Perception, JKU, Vienna

Nov 2022　　　　**Topic:** Representation Learning for Music Generation
Music+AI Reading Group, Mila, Montreal

May 2022　　　　**Topic:** Finer Control for Music Understanding and Generation
9th Conference on Sound and Music Technology, Hangzhou, China

Jun 2020　　　　**Topic:** Learning Controllable Representation of Polyphonic Music
Computer Music Reading Group, Carnegie Mellon University

COMMUNITY SERVICE

Conference and Competition Organization

2024　　　　**Co-organizer**, Music Information Retrieval Evaluation eXchange (MIREX 2024) Competition, San Francisco, USA and online
Responsibilities: task captain of the symbolic music generation task and polyphonic transcription task

June 2021　　　　**Student Volunteer Head**, The International Conference on New Interfaces for Musical Expression (NIME 2021), Online and NYU Shanghai
Responsibilities: volunteer training, hybrid mode technical support, keynote co-host

Conference Reviewer

2024–Present　　　　**Reviewer**, International Conference on Learning Representations (ICLR)
2023–Present　　　　**Reviewer**, Conference on Neural Information Processing Systems (NeurIPS)
2023–Present　　　　**Reviewer**, International Conference on Machine Learning (ICML)
2021–Present　　　　**Reviewer**, International Society for Music Information Retrieval Conference (ISMIR)

Student Development Service

Nov 2023　　　　**Main Presenter/Organizer**, Personal Statement Workshop
Online & MBZUAI, Abu Dhabi

Nov 2022　　　　**Main Presenter**, Personal Statement Workshop
Online & MBZUAI, Abu Dhabi

Nov 2021　　　　**Main Presenter**, Personal Statement Workshop
NYU Shanghai, Shanghai

Oct 2021　　　　**Main Presenter/Organizer**, Personal Statement Workshop
Fudan University, Shanghai