Ziyue (Monica) Piao

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EDUCATION

McGill University, Schulich School of Music Sep. 2022 - Present
Ph.D. in Music Technology *Montreal, Canada*
Supervisors: Prof. Marcelo M. Wanderley and Assoc. Prof. Isabelle Cossette

Shanghai Jiao Tong University, USC-SJTU Institute of Cultural and Creative Industry Sep. 2019 - Mar. 2022
M.A. in Communication and Journalism, English Program *Shanghai, China*
Advisors: Asst. Prof. Gus Xia and Asst. Prof. Zhixin Xu

Beijing University of Posts and Telecommunications, School of Digital Media Sep. 2015 - Jun. 2019
B.E. in Digital Media Technology *Beijing, China*

RESEARCH INTERESTS

My research interests center around New Interfaces for Musical Expression (NIME), with a particular focus on musical haptics and embodied interaction. I aim to use sensor technology and haptics to facilitate a shared kinesthetic music experience among diverse individuals.

PEER-REVIEWED PUBLICATIONS

Journal Articles

- **Ziyue Piao**, Christian Frisson, Bavo Van Kerrebroeck, and Marcelo M. Wanderley, "**Assessing the Impact of Force Feedback in Musical Knobs on Performance and User Experience**", *Actuators*, 2024.

Conference Full Papers

- Leon Lu, Chase Crispin, **Ziyue Piao**, Aino Eze-Anyanwu, and Audrey Girouard, "**Project TapTap: A Longitudinal Study Exploring Non-Verbal Communication through Vibration Signals Between Teachers and Blind or Low Vision Music Learners**", *ACM International Conference on Human Factors in Computing Systems (CHI)*, Yokohama, Japan, 2025

- **Ziyue Piao**, Marcelo M. Wanderley, and Felipe Verdugo, "**MappEMG: Enhancing Music Pedagogy by Mapping Electromyography to Multimodal Feedback**", *Proc. International Conference on ArtsIT, Interactivity and Game Creation (ArtsIT)*, Campinas, Brazil, 2023.

Conference Short Papers *Note: All types of publications except full papers*

- **Ziyue Piao**, "**Exploring Haptics to Augment Kinesthetic Learning in Singing**", *ACM International Conference on Tangible, Embedded, and Embodied Interaction (TEI)*, Bordeaux, France, 2025.

- **Ziyue Piao** and Gus Xia, "**Sensing the Breath: A Multimodal Singing Tutoring Interface with Breath Guidance**", *Proc. International Conference on New Interfaces for Musical Expression (NIME)*, Online, 2022.

- Yinmiao Li, **Ziyue Piao**, and Gus Xia, "**A Wearable Haptic Interface for Breath Guidance in Vocal Training**", *Proc. International Conference on New Interfaces for Musical Expression (NIME)*, Shanghai, China, 2021.

RESEARCH EXPERIENCE

Input Devices and Music Interaction Lab & Music Performance and Body Lab, McGill University Sep. 2022 - Present
Research Assistant, Advisors: Prof. Marcelo M. Wanderley and Assoc. Prof. Isabelle Cossette *Montreal, Canada*

Challenges and Design Opportunities in Singing Breathing Learning:

- Led focus groups with 11 singing teachers and students to identify key challenges in vocal breathing techniques.

Haptic Music Editing Interface for Pitch Modulation:

- Conducted experiments to assess the impact of various force feedback modes on the control of synthesized vibratos.
- Analyzed quantitative data from performance techniques by examining pitch contour data, as well as qualitative data from Likert scale ratings and interviews.

Analyzing Motion Capture and Electromyography in Double Bass Vibrato Performance:

- Led data collection with a professional double bass player, utilizing Qualisys motion capture and Delsys electromyography to analyze shoulder and arm movements for four types of vibrato techniques.

Creative Interactions Lab, Carleton University   May. 2024 - Aug. 2024
Visiting Researcher, Advisors: Prof. Audrey Girouard, Leon Lu   *Ottawa, Canada*

Wearable Haptics for Music Accessibility:
- Conducted a thematic analysis of 10-week longitudinal interviews, focusing on the use of a wearable vibrotactile communication tool among 12 music teachers and visually impaired students.
- Designed interviews and wearable haptic devices to enhance the embodied experience of singing.

Laboratory of Simulation and Movement Modelling, University of Montreal   Sep. 2022 - Aug. 2023
Research Intern, Advisors: Prof. Felipe Verdugo and Prof. Marcelo M. Wanderley   *Montreal, Canada*

MappEMG: Transmitting Muscle Effort to Vibration for Piano Pedagogy:
- Conducted trials using Delsys and BITalino electromyography (EMG) systems for real-time muscle monitoring.
- Developed and deployed MappEMG, a tool that maps EMG data to mobile phone vibrations.
- Led workshops in five music conservatories to evaluate the impact of MappEMG on piano pedagogy.

Computer Music Group, Carnegie Mellon University   Mar. 2021 - Mar. 2022
Research Assistant, Advisor: Prof. Roger B. Dannenberg   *Remote*

Music Computing and Expectation Modeling:
- Researched automated prediction models for musical sequences in contemporary music.
- Enhanced Expectation Network algorithms by transitioning from basic counting methods to more sophisticated gradient descent approaches.

Music X Lab, New York University Shanghai   Mar. 2020 - Jan. 2022
Research Assistant, Advisor: Asst. Prof. Gus Xia   *Shanghai, China*

Multimodal Vocal Tutoring System:
- Integrated sensors to enable real-time detection of breathing pattern.
- Prototyped a wearable device for tracking dynamic breathing movements.
- Combined visual and haptic feedback to significantly enhance the effectiveness of vocal training.

ACHIEVEMENT

Funding and Grants
- **TCH Innovation in Haptics Research Grant**, IEEE Technical Committee on Haptics, $ 2,300 USD.   2024
- **FRQSC Doctoral Scholarship**, Fonds de recherche du Québec, $ 83,334 CAD (Top 1/21).   2024 - 2028
- **Student Engagement Fund Winner** (Collaborators: Alberto Acquilino, Theodora Nestorova), McGill University, $1,500 CAD.   2024
- **Inter-centre Research Exchange Funding**, CIRMMT, $3,000 CAD.   2023
- **Student Award** (Collaborator: Theodora Nestorova), CIRMMT, $10,000 CAD.   2023

Research Awards
- **Best Oral Presentation**, The 2nd International Electronic Conference on Actuator Technology (IECAT) 2024.   2024
- **Best Oral Presentation**, COBS Student Colloquium 2024.   2024

Scholarships
- **Graduate Excellence Award**, McGill University.   2022 - 2025
- **Online Conference Award**, CIRMMT.   2023 - 2024
- **Graduate Research Enhancement and Travel (GREAT) Award**, McGill University.   2023
- **Differential Fee Waiver for International Students**, McGill University.   2022 - 2023
- **NIME 2022 Ableton Scholarship**, International Conference on New Interfaces for Musical Expression.   2022
- **ISMIR 2021 Registration Grant**, International Society for Music Information Retrieval Conference.   2021
- **Hengtong Photoelectric Enterprise Scholarship**, Beijing University of Posts and Telecommunications.   2017
- **1st Prize Academic Excellence Award**, Beijing University of Posts and Telecommunications.   2016, 2018

Other Honors
- **Outstanding Graduate**, Shanghai Jiao Tong University (Top 1%).   2022
- **Outstanding Teaching Assistant Award**, Shanghai Jiao Tong University (Top 1%).   2020
- **Excellent Teaching Assistant Award**, Foundational General Education of Shanghai Jiao Tong University.   2020
- **Outstanding Graduate of Beijing**, Beijing University of Posts and Telecommunications (Top 3%).   2019
- **Honorable Prize**, International Mathematical Contest in Modeling.   2018

Teaching

McGill University
Instructor

- MUMT 302 New Media Production 1   2025 Winter
- MUMT 302 New Media Production 1   2024 Winter

Guest Lecturer

- MUPD 235 Music as a Profession: Musical Haptics and Musicians   2025 Winter
- MUMT 620 Gestural Control of Sound Synthesis: Designing a Multimodal Interface for Music Pedagogy   2023 Fall

New York University
Guest Lecturer

- CSCI-SHU 188 Introduction to Computer Music: How to Design a Singing Tutoring Interface   2021 Fall
- CSCI-SHU 188 Introduction to Computer Music: Design a Single Thread System — a Singing Tutoring UI Demo   2020 Fall

Shanghai Jiao Tong University
Teaching Assistant

- Introduction to Computer Music   2021 Winter
- Symphony   2020 Fall
- Chinese and Western Music Theory   2020 Spring

Mentoring

- **Anya Valimahomed (2024), Undergraduate in Psychology, McGill University**: Using Educational Models for Analyzing Kinesthetic Learning Opportunities
- **Gabrielle Seymour (2023-2024), Undergraduate in Computer Science, McGill University**: Audio-Visual Interactive for Ambient Music Generation

Presentations and Symposia

Organized Academic Events

- CIRMMT-OICRM-BRAMS (COBS) Student Colloquium, Chair, *CIRMMT & McGill University*.   May 2025
- Tech-Enhanced Music Education Symposium, Organizer, *McGill University*.   May 2024
- Tangible and Affective Interface Design for Music and Sound Art with Prof. Karon MacLean, Organizer, *CIRMMT*.   Nov. 2023

Invited Talks

- Sensing the Breath: Multimodal Singing Tutoring Interfaces with Breath Guidance, *Music + AI Reading Group, Mila*.   Oct. 2022

Presentations

- Assessing the Impact of Force Feedback in Musical Knobs on Performance and User Experience, *IECAT Conference 2024*.   Nov. 2024
- SenSing: Transmitting Kinesthetic Breathing Experiences for Voice Pedagogy, *PAVA Symposium 2024*.   Oct. 2024
- Preliminary Exploration of Kinesthetic Breathing Feedback for Enhanced Vocal Pedagogy, *COBS Student Colloquium*.   May 2024
- Designing a Multimodal Interface for Music Pedagogy, *CIRMMT Workshop with Prof. Karon MacLean*.   Nov. 2023
- SenSing: Transmitting Kinesthetic Breathing Experiences for Voice Pedagogy, *CIRMMT MMR Re-Open Celebration*.   Oct. 2023
- SenSing: Transmitting Kinesthetic Breathing Experiences for Voice Pedagogy, *COBS Student Colloquium*.   May 2023
- MappEMG – Feeling the muscle activity of classical musicians, *CIRMMT Workshop on Piano Knowledge Transfer*.   May 2023
- Sensing the Singing Body, *CIRMMT Workshop with Pamela Z*.   Jan. 2023
- Multimodal Singing Tutoring Interfaces Design for Breathing Guidance, *IDMIL, McGill University*.   Sep. 2022

Academic Services

- **Conference Reviewer**: NIME 2022, NIME 2024, UbiComp 2024, ArtsIT 2024, TEI 2025, and CHI 2025.
- **Committee Members**: ArtsIT 2024
- **Conference Volunteer**: Senior Volunteer of NIME 2021, Volunteer of ISMIR 2024
- **CIRMMT Student Representative**: Collaborating with Miranda Jackson (2024 - present).
- **CIRMMT Student Coordinator**: CIRMMT Research Axis 3: Cognition, perception, and movement (2023 - 2024).
- **Academic Affairs Assistant**: Evaluated the Outstanding Teaching Assistant Award at Shanghai Jiao Tong University (2021 - 2022).
- **Student Member**: CIRMMT, IEEE Technical Committee on Haptics, Association for Computing Machinery, SIGCHI, The Voice Foundation, Pan American Vocology Association,

ACTIVITIES

- **Soprano Classical Singer**: Under the guidance of Dr. Irene M Feher with piano accompaniment provided by Giancarlo Scalia (2022 - present).
- **Choir**: Served as the Alto Singer in the Shanghai Jiao Tong University (SJTU) Chamber Choir (2020 - 2021).
- **Orchestra**: Played the Guzheng (Chinese zither) in the SJTU Rongchang Chinese and Western Orchestra (2019 - 2020).
- **Design**: Designed the graduation souvenir shirt for the economics double major Class at Peking University in 2019.
- **Field Research**: Led the Henan No.10 team during the Peking University Enterprise Survey for Entrepreneurship in 2018.
- **Art Director**: Managed the organization of singing and dancing performances at School of Digital Media (2015 - 2019).

SKILLS

- **Programming**: Python*, C++, Javascript*.
- **Audio Production**: Logic Pro*, Audition, PureData*, MAX MSP.
- **Prototyping**: Arduino*, Fusion 360, 3D Printing.
- **VR, AR and Game**: Maya*, Processing*, Unity, After Effects.
- **Graphic Design**: Illustrator*, Photoshop*.
- **Toolkits**: scikit, PyTorch.
- **Languages**: Mandarin (native), English (advanced), French (beginner).

*Items marked with *: professional proficiency; others: used at least once in projects.*

REFERENCES

Prof. Marcelo M. Wanderley	McGill University	marcelo.wanderley@mcgill.ca
Assoc. Prof. Isabelle Cossette	McGill University	isabelle.cossette1@mcgill.ca
Prof. Roger B. Dannenberg	Carnegie Mellon University	rbd@cs.cmu.edu
Asst. Prof. Gus Xia	MBZUAI	gus.xia@mbzuai.ac.ae

Available upon request.