

Yinghao Ma (马英浩)

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EDUCATION

Queen Mary University of London (QMUL)

09/2022 – 09/2027 (expected)

PhD: AI & Music, School of Electronic Engineering and Computer Science. Supervised by Dr Emmanouil Benetos

- Research interests: **Large language models (LLMs) for music understanding & generation**
- Leadership: Co-founder of the [Multimodal Art Projection](#) community ([Hugging-face](#));

Carnegie Mellon University (CMU)

09/2020 – 08/2022

MS: Music & Technology, School of Music. Supervised by Prof. Richard M. Stern

- Overall GPA: 4.03/4.00 (Top 1 of the grade)
- Awards and Honours: Fellowship for master students that covers 50% of tuition fee
U.S. National Music Honor Society member. (Theta Xi, Pi Kappa Lambda reward).
- Music Background: Recorded Chinese musical version of Beethoven's serenade for 250th anniversary of his birth during COVID to cheer others up. Released on CMU DL course web

Peking University (PKU)

09/2016 – 07/2020

BS: Mathematics & Applied Mathematics (Probability Theory), School of Mathematical Sciences

- Awards and Honours: Outstanding graduates of the School of Mathematical Science at PKU
Preliminary excellence prize for S.-T.Yau College Student Mathematics Contests
- Music Background: One of the student conductors in the orchestra of the Chinese Music Institute at PKU
The amateur highest level of Chinese flutes, China Conservatory of Music

(CO)-FIRST AUTHOR PUBLICATION

- **Ma, Y.**, Li, S., Yu, J. et al. "CMI-Bench: A Comprehensive Benchmark for Evaluating Music Instruction Following." [Submission under double-blind reviewing]
- Li, Y.*, Zhang, G.*, **Ma, Y.***, et al. "OmniBench: Towards The Future of Universal Omni-Language Models." [Submission under double-blind reviewing]
- **Ma, Y.**, Øland, A., Ragni, A., et al. "Foundation models for music: A survey." [Huggingface Daily Paper top3. Submission to ACM Computing Survey Journal]
- Qu, X.*, Bai, Y.*, **Ma, Y.***, et al. "MuPT: A Generative Symbolic Music Pretrained Transformer." International Conference on Learning Representations (ICLR) 2025.
- Deng, Z.*, **Ma, Y.***, Liu, Y. et al. "MusiLingo: Bridging Music and Text with Pre-trained Language Models for Music Captioning and Query Response." North American Chapter of the Association for Computational Linguistics 2024.
- Li, D.*, **Ma, Y.***, et al. "Mertech: Instrument Playing Technique Detection Using Self-supervised Pretrained Model with Multi-task Finetuning." International Conference on Acoustics, Speech & Signal Processing (ICASSP) 2024.
- Li, Y.*, Yuan, R.*, Zhang, G.*, **Ma, Y.***, et al. "MERT: Acoustic Music Understanding Model with Large-Scale Self-supervised Training." International Conference on Learning Representations (ICLR) 2024.
- Yuan, R.*, **Ma, Y.***, Li, Y.*, et al. "MARBLE: Music Audio Representation Benchmark for universal Evaluation." Advances in Neural Information Processing Systems (NeurIPS), 2023.
- **Ma, Y.**, Yuan, R., Li, Y., et al. "On the Effectiveness of Speech Self-Supervised Learning for Music." International Society for Music Information Retrieval (ISMIR), 2023.

RESEARCH EXPERIENCE

Controlled Genre-Specific Acoustic Music Generation

12/2024 – 04/2025

Collabourate with Dr Chenghua Lin, University of Manchester

- Establish a pseudo-subjective evaluation pipeline on music quality based on pre-trained audio-textual LLMs.
- Predict loss value of music LLM based on base/medium language model performance.

OmniBench: Towards The Future of Universal Omni-Language Models

06/2024 – 09/2024

Collabourate with Dr Wenhao Huang, 01.ai

- Constructed music questions in OmniBench to assess reasoning capabilities across tri-modal inputs (image, audio, text), setting a new standard for evaluating omni-language models in complex, integrated scenarios.
- Analysis large audio-language models' performance in multi-modal reasoning tasks, uncovering critical limitations in instruction-following and reasoning across modalities.

Symbolic Music Scaling (SMS) Law for a Symbolic Music GPT

01/2024 – 03/2024

Collabourate with Dr Jie Fu, Hong Kong University of Science and Technology

- Developed and integrated the SMS Law into Symbolic Music GPT, optimising model scalability and

efficiency, which led to enhanced performance with constrained computational resources.

- Analyses overfitted loss curve to predict the early stop points during training.

Bridging Music & Text with Pre-trained Models for Music Captioning and QA 07/2023 – 11/2023

Supervised by Dr Emmanouil Benetos, Centre for Digital Music, Queen Mary University of London

- Set up Music Instruct (MI) query-response dataset based on captions & well-designed prompts to GPT-4.
- Achieved cutting-edge performance in question answering on both MusicQA and Music Instruct datasets.

Instrument Playing Technique (IPT) Detection on World Music 06/2023 – 09/2023

Supervised by Dr Emmanouil Benetos, Centre for Digital Music, Queen Mary University of London

MARBLE: Music Audio Representation Benchmark for universal Evaluation 01/2023 – 06/2023

Supervised by Dr Emmanouil Benetos, Centre for Digital Music, Queen Mary University of London

- Designing the downstream tasks, datasets, evaluation metrics and state-of-the-art results.
- Implemented the mir_eval metrics with torchmetrics and developing utilisation for sequential tasks.
- Established a fair, reproducible and universal music information retrieval benchmark for future work.

Acoustic Music Understanding Model with Large-Scale Self-supervised Training 08/2022 – 05/2023

Supervised by Dr Emmanouil Benetos, Centre for Digital Music, Queen Mary University of London

- Built self-supervised learning systems, acquiring 50k+ downloading of checkpoints on Huggingface.
- Replaced the pseudo-tag from MFCCs to Chroma music features for harmonic information.
- Utilising deep features like Encodec instead of k-means for scaling up models to 1 B parameters.

Learnable Front End for Music, Speech and Audio (Master thesis) 09/2021 – 07/2022

Master Thesis, Supervised by Prof. Richard Stern, Carnegie Mellon University

Chinese Flute Playing Technique Classification Based on FCNNs (undergraduate thesis) 02/2020 – 05/2020

Undergraduate Thesis, Supervised by Prof. Xiaoou Chen, Peking University

Correspondence between Speech Melody and Pitch Contour in Sichuan Folk Songs 07/2019 – 09/2019

Research Assistant, Supervised by Prof. Zhiyao Duan, University of Rochester

Automatic Musical Instrument Recognition and Timbre Recognition 02/2019 – 07/2019

Research Assistant, Supervised by Prof. Xiaoou Chen, Peking University

WORK EXPERIENCE

Tempo, Beat and Downbeat Detection in Chinese Pop Songs (internship) 06/2020 – 08/2020

Algorithm Engineer, Beijing Deepmusic Technology Co. (Beijing, China)

- Built beat detection pipelines with LSTMs & TCNs, significantly outperforming librosa & madmom libraries.
- Estimated tempo and beat of Chinese pop songs producing 98% accuracy on the tempo prediction.

Cover Song Detection & Evaluation of Automatic Speech Recognition (internship) 05/2021 – 08/2021

Algorithm Engineer, Tencent Holdings Limited. (Beijing, China)

Teaching Assistant & Guest Lecturer of Machine Learning for Signal Processing 08/2021 – 12/2021

Teaching Assistant of Digital Signal Processing 02/2022 – 05/2022

Teaching Assistant of Applied Statistics 09/2023 – 12/2023

Teaching Assistant of Deep Learning for Audio & Music 02/2024 – 04/2024

Multimodal Understanding for Acoustic Music (internship) 08/2024 – 10/2024

Algorithm Engineer, Research and Development, Yamaha Corporation (Hamamatsu, Japan)

SELECTED ACADEMIC ACHIEVEMENT

Advanced Digital Signal Processing

- 1st rank of the class. Proofread lecture notes' errata, listed in acknowledgements.
- Signal sampling, interpolation, STFT, classical estimation and maximum entropy of PSD function, LPC, adaptive filtering, microphone array and beam forming. MFCC, Introduction to Wavelet Analysis.

Introduction to Deep Learning (A), Scalability Machine Learning (A+), Convex Optimisation (A+)

LEADERSHIP & SKILLS

- One of the student conductors at the Chinese Music Institute at Peking University. Guided rehearsals of philharmonic chamber and concert. Organised seminar on music theory and music information retrieval.
- Organised charitable activities. social research and publicity for the disabled and people with rare diseases.
- Python (>5k LOC); MATLAB, C (>500 LOC)