

Zehao Wang

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Education

- **Peking University** **Beijing, China**
Undergraduate *2017 – 2021(Expected)*
Major in Data Science (Math), School of Mathematical Sciences, advised by Prof. Zhanxing Zhu
Major in Psychology, School of Psychological and Cognitive Sciences, advised by Prof. Yan Bao
- **China Conservatory of Music** **Beijing, China**
Private Course *2017 – present*
Music Composition
Advisor: Prof. Fei Wang

Experience (Detailed information can be found in my [website.](http://zehao.mathemusics.com))

Academic

- **New York University Shanghai** **Shanghai, China**
Music X Lab *May 2020 - present*
Host: Prof. Gus G. Xia
 - Disentanglement representation learning for controllable chord progression generation based on VAE.
- **School of Psychological and Cognitive Sciences, Peking University** **Beijing, China**
Bao Lab *Mar 2020 - present*
Advisor: Prof. Yan Bao
 - Bayesian model of internal reference in temporal perception.
- **Queen Mary University of London & Central Conservatory of Music** **Beijing, China**
Innovative Instrument Design - Du Xian Qin International Workshop *Sep 2019*
Host: Prof. Nick Bryan-Kinns & Prof. Zijin Li
 - Improving and augmenting the traditional Duxianqin, designing some new functions for it, mainly about the joystick.
 - Chinese website construction and English-Chinese translation.
- **CCRMA, Stanford University** **Palo Alto, CA, U.S.**
Neural Networks for Music Workshop *Aug 2019*
Host: Prof. Wendy Ju & David Goedicke
 - Using ResNet for real-time audio classification.
 - Collecting and recording the Stanford sound dataset.
- **School of Mathematical Sciences, Peking University** **Beijing, China**
Deep Learning Lab *May 2019 - Sep 2020*
Advisor: Prof. Zhanxing Zhu
 - Working on algorithms and theoretical analysis for robustness and interpretability of deep neural network.
 - Theoretical analysis on frequency domain of gradient-based adversarial examples of neural network.
- **Wangxuan Institute of Computer Technology, Peking University** **Beijing, China**
Digital Audio Lab *Apr 2018 - Dec 2019*
Advisor: Prof. Xiaou Chen
 - Improving a two-stage automatic pitch correction framework of singing voice using WSOLA algorithm and PyWorld.
 - Releasing a dataset and designing a FCN based algorithm for musical instrument playing technique detection.
 - Proposing some melody features for designing a melody co-creation system based on Transformer.

Industry (both technology and music)

- **ByteDance** **Beijing & Shanghai, China**
Research Intern in AI Lab, Mentor: Dr. Bilei Zhu *Dec 2019 - Sep 2020*
 - Designing a framework for automatic music generation including melody, chord and texture through both rule-based and deep learning methods.
 - Also participating in audio watermarking and cover song identification.

- **Microsoft** **Beijing, China**
 - *Research Intern in Speech Group, Mentor: Dr. Lei He and Xi Wang* *Jun 2019 - Dec 2019*
 - High-fidelity singing voice synthesis through the Tacotron and Google's NSynth framework.
 - **Illiacc Software** *Feb 2020 - present*
 - *Chinese Localization for Harmonia(software)*
 - Working with Prof. Heinrich Taube (UIUC) on English-Chinese translation and Chinese localization (including business market and notations & courses of music theory).
 - **Dream Music Studio (Composer Ye Liu's Studio)** **Beijing, China**
 - *Assistant Composer for Screen Scoring* *Mar 2019 - Aug 2019*
 - Working with Composer Ye Liu as orchestrator, mock-up producer and record producer on some screen scoring, including film, TV series and advertisement.

Teaching and Other Music Experience.....

- **Academy of Opera, Peking University** **Beijing, China**
 - *Adjunct Piano Accompanist* *Apr 2019 - present*
 - Working for rehearsal and concert, including art songs, chorus and opera.
 - **Teaching**
 - Teaching assistant:
 - Economics and Computation, 2019 Summer, Peking University
 - Lecturer:
 - American Mathematics Competitions (in English), 2020 Summer, Online
 - Mathematical Olympiad, 2017 Summer, Zhengzhou No.1 High School
 - **Other music experience**
 - Independent music producer (on Xiami Music & Netease Music)
 - Orchestra and choir arranger
 - Piano accompanist, chamber music conductor

Publications

(* denotes equal contribution)

Regular Papers (including submissions and preprints).....

1. **Zehao Wang***, Bochen Lyu*, Pu Yang*, Zhanxing Zhu. **A frequency domain analysis of gradient-based adversarial examples**, *submitted to ICLR 2021*, 2020.
2. **Zehao Wang**, Zhesong Yu, Xiaoou Chen, Bilei Zhu, Yuan Wan, Zejun Ma. **Compose with Me: Co-Creating Melody with Transformer and Selecting by Phrase-Level Melody Features**, *preprint*, 2020.
3. **Zehao Wang***, Jingru Li*, Xiaoou Chen, Zijin Li, Shicheng Zhang, Baoqiang Han, Deshun Yang. **Musical Instrument Playing Technique Detection Based on FCN: Using Chinese Musical Instruments as Examples**, *to submit to a journal, arXiv preprint(previous version): 1910.09021*, 2020.
(Short Version appears at *ECML PKDD 2020 - 13th International Workshop on Machine Learning and Music* as a **Contributed Talk**.)
4. **Zehao Wang***, Shicheng Zhang, Xiaoou Chen. **Exploring Inherent Properties of the Monophonic Melody of Songs**, *arXiv preprint: 2003.09287*, 2020.

Workshop Papers.....

1. **Zehao Wang***, Jingru Li*, Xiaoou Chen, Zijin Li, Shicheng Zhang, Baoqiang Han, Deshun Yang. **Deep Learning vs. Traditional MIR: a Case Study on Musical Instrument Playing Technique Detection**, *ECML PKDD 2020 - 13th International Workshop on Machine Learning and Music*, 2020.

Skills

- **Programming:** Python>=Matlab>C++=Java=HTML=Julia
- **Framework:** Pytorch & TensorFlow (Deep Learning); React.js (Front-end); JUCE, Csound, Supercollider, Puredata and Faust (Music Related)
- **Language:** Chinese(Native), English(Fluent)

Honors and Awards

The First Prize of Contemporary Undergraduate Mathematical Contest in Modeling	Sep 2018
The Silver Medal of 32nd Chinese Mathematical Olympiad	Dec 2016
The Second Place of 32nd National Mathematics League in Henan Division	Sep 2016
The Third Place of 13th Chinese Southeast Mathematical Olympiad	Aug 2016
The First Place of Pearl River - Kayserburg International Youth Piano Competition	Aug 2015
The Second Prize of Musical Ensemble Track in Art Festival of Henan Province	Jul 2015