# ZHE ZHANG

**Email:** zhangzhe2018@mail.ioa.ac.cn; **Phone:** +86-17343032202
No. 21 North 4th Ring Road, Haidian District, Beijing 100190, China

## EDUCATION

**Institute of Acoustics, Chinese Academy of Sciences (IACAS)** **09/2017-Present**
Candidate, M.E. in Electronic Engineering
Major in Audio Signal Processing
Overall GPA: 3.63/4.0

**School of Physics Science and Engineering, Tongji University** **09/2013-06/2017**
B.S. in Applied Physics
Major in Acoustics
Overall GPA: 4.5/5.0

## RESEARCH EXPERIENCE

**Real-time DSP Sound Source Localization System Based on Circular Microphone Array Using SRP Method in Harmonic Domain**
**Institute of Acoustics, Chinese Academy of Sciences (IACAS)**
**05/2019-Present**

- Optimized SRP method in circular harmonic domain algorithm for DSP-based real-time system.
- Developed C library functions to support complex matrix manipulations on DSP.
- Developed a framework for DSP implementation of sound source localization algorithms.
- Experimented with the prototype system and evaluated the accuracy of azimuth estimated.
- Developed the TCP server on PC to display the estimated result and visualize the spatial spectrum.
- Attempted to combine the sound localization with audio content analysis features.

**Sound Localization and Separation in Three-dimensional Space Using a Single Microphone with a Metamaterial Enclosure**
**Institute of Acoustics, Chinese Academy of Sciences (IACAS)**
**02/2019-07/2019**

- Instructed experiment procedure, made experiment plan, and designed the demonstration method.
- Conducted binaural recording session using Head and Torso Simulator.
- Routed audio hardware and software and solved technical problems.
- Mixed recorded audio tracks, processed corresponding video, and produced the supporting materials.

**DSP-Based Implementation of a Real-time Sound Field Visualization System**
**Institute of Acoustics, Chinese Academy of Sciences (IACAS)**
**08/2018-01/2019**

- Modified and improved the hardware of TMS320C6678 DSP develop board and microphone array.
- Performed simulation experiments of SONAH algorithms to evaluate the results and complexity of

the algorithm via MATLAB.

- Designed a multi-core program framework taking advantages of multi-core structure and DDR3 memory to support large computing task with a large storage of coefficients.
- Developed and tested the embedded programs via computer simulation and experiments.
- Experimented with the prototype and evaluated the resolution of sound visualization.
- Worked on the paper and gave an oral report in ICHSA 2019.

**Improved MUSIC Algorithm with Enhanced Matrix for Estimating Harmonic Components**
**Institute of Acoustics, Chinese Academy of Sciences (IACAS)**
**11/2017-02/2018**

- Proposed a method of estimating the number of harmonic components by observing the trend of eigenvalues of self-correlation matrix of the signal's enhanced matrix.
- Performed the experiments of estimating harmonic components in different SNR situations to evaluate the algorithm.
- Compared the effects of using different window functions.
- Compare the results with the Periodogram method.

**Undergraduate Thesis: Measurement of Total Sound Energy Density Based on Sound Field Microphone**
**Institute of Acoustics, Tongji University**
**01/2017-06/2017**

- Designed the structure for recording A-Format audio signals in different cardinal directions based on Soundfield SPS200 microphone.
- Measured frequency response of the microphone element from different directions in 3D space.
- Derived the ideal spatial response of B-Format from spherical harmonic functions.
- Computed the filter banks converting A-Format signals captured by the microphone array to B-Format signals using the Least Square Method.
- Compared the results of conversion between the built filter bank and the audio plug-in SurroundZone officially provided by Soundfield.

**Study on the Decay of Sound Energy in Stage-Auditorium Coupled Sound Field of Theaters**
**Institute of Acoustics, Tongji University**
**06/2016-09/2017**

- Designed and supervised the construction of the scale model of the theater in sound-proof chamber.
- Measured the T60s of certain points of stage and auditorium inside the model under different situations of acoustical absorption coefficients.
- Analyzed the collected data to predict the reverberation in different location inside a theater with acoustical coupling phenomenon between stage and auditorium.

## PUBLICATIONS

- Zhe Zhang, Ming Wu, Jun Yang. DSP-Based Implementation of a Real-Time Sound Field Visualization System Using SONAH Algorithm[C]. Advances in Harmony Search, Soft Computing and Applications. ICHSA 2019. Advances in Intelligent Systems and Computing, vol 1063, 2019.

- Xuecong Sun, Han Jia, Zhe Zhang, et al. Sound Localization and Separation in Three-dimensional Space Using a Single Microphone with a Metamaterial Enclosure[J]. arXiv:1908.08160, 2019. (Submitted)
- Xinyu Han, Ming Wu, Jun Yang, Zhe Zhang. Sound Source Localization Using Distributed Microphone in Spherical Harmonics Domain[J]. Journal of Signal Processing, 2019. (Accepted)

## HONORS & AWARDS

- Academic Scholarship, IACAS, 2019
- AMBASSADOR of Kadenze, Kadenze, 2019
- Academic Scholarship, IACAS, 2018
- National Encouragement Scholarship, Tongji University, 2016
- 2nd Class Outstanding Student Scholarship, Tongji University, 2015
- 1st Class Outstanding Student Scholarship, Tongji University, 2014
- Successful Participant MCM/ICM Contest, Tongji University, 2014

## INTERNS & ACTIVITIES

- Recording & Mixing Engineer, E-Business (band), Beijing, 10/2019-present
- Audio Engineer & PA Engineer, Traditional Orchestra of University of Chinese Academy of Sciences, Beijing, 09/2018-07/2019
- One-man band, The Artifacts of Ripples, Beijing, 03/2018-Present
- Tech documents composing and translation, Waves Audio Ltd., Beijing, 11/2017-02/2018
- Composing, Arrangement, Recording, Mixing and Guitarist, Subaqua Roaming Guide (band), Beijing, 09/2017-06/2018
- Recording Engineer, The Machinery of Other Skeletons (band), Shanghai, 06/2016-11/2016
- Associate Sound Engineer & Stage Tech, MAO Livehouse, Shanghai, 10/2015-02/2017
- Bassist & Producer, Narcissus (band), Shanghai, 05/2015–06/2017
- Investigator, Environmental Protection Agency of Zhabei District, Shanghai, 2014 Summer

## MORE INFO

My detailed CV: https://zhezhang.me/cv/
My personal portfolio: https://zhezhang.me/portfolio/