

# JIAYING LI

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## EDUCATION

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### Georgia Institute of Technology

Atlanta, USA

*Master of Science in Music Technology (3.70/4.0)*

01/2022 - 12/2023

Advisor: Dr. Nathaniel Condit-Schultz

Courses: Digital Audio Processing for Music, Digital Speech Signal Processing, Statistical Machine Learning, Machine Learning, Fourier Techniques & Signal Analysis, Music Perception & Cognition, Cognitive Science, etc.

### The Chinese University of Hong Kong, Shenzhen

Shenzhen, China

*Bachelor of Engineering in Electrical Information Engineering (3.23/4.0)*

09/2017 - 05/2021

*Minor in Philosophy*

09/2018 - 05/2021

Advisor: Dr. Zhi-Quan Luo

Courses: Statistics, Linear Algebra, Optimization, Data Structures, Analog Integrated Circuits, Microprocessors & Computer Systems, Multimedia Coding & Networking, etc.

## PUBLICATION & CONFERENCE

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• **J. Li** and N Condit-Schultz, “Four Chords Go a Long Way: Measuring Chord Progression Similarity in Chinese Popular Music”, 2022 Society for Music Perception and Cognition (SMPC), poster session.

• K. Xue, Z. Liu, **J. Li**, X. Ji and H. Qian, “SongBot: An Interactive Music Generation Robotic System for Non-Musicians Learning from A Song”, 2021 IEEE International Conference on Real-time Computing and Robotics (RCAR)

## RESEARCH EXPERIENCES

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### Woods Hole Oceanographic Institution (WHOI) Alvin Submersible VR Simulator

09/2023 - 12/2023

Advisor: Dr. Bruce Walker

Atlanta, USA

- Built the ALVIN submersible model in Blender based on a 360-degree photo and successfully integrated it into Unity.
- Tested the model on Meta Quest 3 and optimized its scale for human perception.
- Developed an orientation system and safety training workflow, allowing users to interact with Meta Quest 3 controllers after reading instructions.

### Audio Technology II Interaction Website

01/2023 - 05/2023

Research Assistant, Computational and Cognitive Musicology Lab

Atlanta, USA

Advisor: Dr. Claire Arthur

- Developed a website using JavaScript, HTML and CSS, and migrated lecture notes for MUSI 2526 (Introduction to Audio Technology II) to the website.
- Built the required Python environment and wrote installation instructions for MUSI 2526 students.
- Built interactive modules utilizing D3js and Python Bokeh to illustrate and visualize Digital Signal Processing (DSP) concepts, including sampling, DFT, convolution, autocorrelation, etc.

### Perceptual Harmonic Similarity Adapted to Human Ear

01/2022 - 11/2022

Advisor: Dr. Nathaniel Condit-Schultz

Atlanta, USA

Computational and Cognitive Musicology Lab, Georgia Institute of Technology

- Collected a dataset comprising harmonic progressions from the top 200 Chinese Pop music between 2012 and 2021.
- Developed the Chord Progression Similarity Index (CPSI) as an objective metric based on Markov chains tailored to human perception.
- Designed an experimental interface using jsPsych to test the validity of CPSI and gathered results from 34 participants.
- Analyzed the experiment data using the DBSCAN model alongside statistical tests.

## SELECTED PROJECTS

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## Mid Air Text Interaction with Hand-Tracking

09/2023 - Present

Advisor: Dr. Yalong Yang

Atlanta, USA

- Reviewed literature on mid-air text entry methods based on hand-tracking in Virtual Reality (VR) and compared their performances.
- Developed a hand-tracking VR text interaction system, including functions such as text entry, selection, copying, pasting, etc., using Unity.

## Accessible Learning Material User Interface Prototype for Disabled Students

06/2023 - 08/2023

Advisor: Dr. Michael Helms

Atlanta, USA

- Conducted 25 interviews regarding website design for visually impaired users and proposed a streamlined workflow model to optimize the design process.
- Developed a demo website using JavaScript, HTML, and CSS to showcase essential functions aiding visually impaired users in accessing learning materials.
- Designed an interactive mobile APP interface using Figma to illustrate and visualize the prototype.

## Target Timbre Mapping Based on Raw Waveform

02/2023 - 09/2023

Advisor: Dr. Nathaniel Condit-Schultz

Atlanta, USA

- Collected a 389-minute singing voice dataset, including 15 different songs sung by 7 different singers.
- Framed the vocal audio by pitch blocks manually and implemented the raw waveform singing voice timbre mapping using LSTM model.
- Designed a human-subject psychology experiment interface by jsPsych to identify factors influencing people's judgments of AI-generated vocals.

## Arbitrary Modification of Speech Characteristics in Segmental Durations

02/2022 - 05/2022

Advisor: Dr. Bing Hwang Juang

Atlanta, USA

- Implemented speech speed changer without pitch shifting using SOLAFS, Phase Vocoder, and WSOLA algorithms.
- Created an auto-segmenting system that outputs segmental timestamps and signal values to approximate the continuous contour input.
- Developed a Matlab GUI to enable arbitrary modification of speech speed and playback the modified signal.

## INTERNSHIPS

### User Experience Product Engineer Intern

08/2021 - 12/2021

SZ DJI Technology CO., LTD.

Shenzhen, China

- Conducted perceptual experiments to analyze factors contributing to cybersickness, focusing on the optical characteristics of the lens and establishing acceptable product parameter ranges.
- Conducted ergonomics experiments to improve the design of DJI Goggles 2 mask's shape and weight considering the downward tilt of people's eyes when observing objects in a relaxed state.
- Led 20 interviews on drone safety, participated in the design of DJI Avata backup camera, and re-designed the drone simulator user interface.

### Music Entertainment User Experience Intern

09/2020 - 03/2021

Kuwo Music, Tencent Music Entertainment

Shenzhen, China

- Collected the daily click-through rate data of the Kuwo Music mobile APP and extended the Tencent Music database.
- Completed the fourth quarter product planning report and a sixteen-page competitive product analysis report.

## SKILLS

### Programming

Python, JavaScript, C#, Java, R, MATLAB, HTML, CSS

### Visualization

Unity, Blender, D3js, Bokeh

### Machine Learning

Numpy, Pandas, SciPy, TensorFlow, PyTorch, Keras

### Tools

Microsoft Office, Adobe Premiere, Photoshop, Logic Pro, MAX, XMind, Axure