

# Huanchen CAI

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Experienced engineer and doctoral researcher specializing in speech quality assessment. Proven track record in algorithm design and implementation for audio analysis and synthesis model evaluation. Skilled in statistical modeling, machine learning, and data collection and cross-functional collaboration.

## Education

**KTH Royal Institute of Technology, PhD EECS** **2021.1 - Present**

Major: Acoustics | Minor: Machine Learning.

**Peking University, MA** **2017.9 – 2020.6**

Major: Applied and experimental phonetics | Minor: Computer Science, Cognitive Science.

## Work Experiences

**KTH TMH Lab | Doctoral student** **2021.1 - Present**

- Developed Voice Map, a novel multidimensional evaluation framework for **AI speech quality assessment**, integrating DSP and supervised learning to assess 20+ TTS models and hundreds of hours of speech.
- Led the implementation for clinical voice assessment, enabling quantitative analysis of voice datasets containing hundreds of voice patients and facilitate diagnostic capabilities in clinical settings.

**ByteDance AI Lab | TTS Consult** **2020.4 - 2021.1**

- Participated in the development of **TikTok/Douyin's voice-over** feature from initial concept to platform-wide adoption, creating the foundation for what would become one of the platform's most widely-used creator tools that reached over 500,000 content creators.
- Established speech **quality assessment frameworks** through A/B testing and user studies, establishing core metrics and optimization frameworks.

**Dali Education | TTS Specialist** **2020.1 - 2020.4**

- Developed and deployed customized TTS voices for **GuaGua Long**, creating engaging audio content for online educational resources used by school students.
- Designed interactive voice solutions for Dali Lamp, resulting in an innovative voice-enabled study companion for students.

**PKU Linguistics Lab | Research Assistant** **2017.9 - 2020.1**

- Developed and maintained the laboratory's webpage presence while curating an interactive audio archive of campus acoustic environments.

**TsingHua University | Assistant Lecturer** **2016.6 - 2016.12**

- Designed and directed a distinguished Mandarin Chinese MOOC that achieved #1 ranking among language learning courses over the world.

## Projects

**Grenoble University** **2022.11 - 2023.11**

- Developed clinical voice assessment tools to support physicians in patient voice rehabilitation.

- Engineered and scaled production of a novel voice isolation recording **microphone** from prototype to manufacturing.
- Participated in audible culture **museum** initiative, establishing partnerships with music industry stakeholders and cultural institutions while conducting interdisciplinary research on audio heritage preservation.

## Publications

- Voice Mapping of Text-to-Speech Systems: A Metric-Based Approach for Voice Quality Assessment. Under review in *Eurasip Journal on Audio, Speech, and Music Processing*.
- A WaveNet-Based Model for Predicting the Electroglottographic Signal from the Acoustic Voice Signal. Under review in *JASA*.
- Effects on Voice Quality of Thyroidectomy: A Qualitative and Quantitative Study Using Voice Maps. *Journal of Voice*, 2024.
- Effects of Speech Characteristics on Electroglottographic and Instrumental Acoustic Voice Analysis Metrics in Women with Structural Dysphonia Before and After Treatment. *Journal of Speech, Language, and Hearing Research*, 2024.
- Mapping Phonation Types by Clustering of Multiple Metrics. *Applied Sciences*, 2022.
- Increasing the Diagnostic Value of Electroglottographic Metrics using Matched Comparisons. *51st Annual Symposium: Care of the Professional Voice*, 2022.
- Spectrum Analysis of Bone-conducted Speech: A Study Based on Intelligibility. *ISAIMS*, 2020.
- Acoustic Analysis of PuXian Dialect's Tone. *ChinaXiv*, 2020.
- Acoustic Analysis of Resonance Characteristics of Head Voice and Chest Voice. *CISP-BMEI*, 2019.

## Awards & Honors

- Karl Engvar Foundation Research Fellowship (2024).
- KTH Travel Research Grant (2022).
- Peking University Academic Excellence Award (2019).
- National Scholarship for Academic Achievement, Ministry of Education, China (2017).

## Skills & Interests

- Development: Python, MATLAB, HTML/CSS, Linux, Git.
- ML/AI: Kaldi, ESPnet, Coqui, PyTorch, TensorFlow, Librosa.
- Audio: Logic Pro, FL Studio, Praat.
- Interests: Skiing, Snowboarding, Swimming, Diving, Surfing, Flute Performance.