Zhongxuan Mao

Research Assistant | Speech, Learning, and the Brain (SLaB) Lab

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EDUCATION

Nanjing University of Science and Technology (NJUST)

Sep. 2021 – Jun. 2025

B.A. in Linguistics, School of Foreign Studies | GPA: 3.89/4.0 | Rank: 2/21

- Selected coursework: Introduction to Phonetics (96), Introduction to Phonology (95), Comprehensive Experiments in Neurolinguistics (91), Statistical Methods in Language Research (90), Python Programming (92), Advanced Mathematics (91), Linear Algebra (89).

APPOINTMENT

Research Assistant, The Hong Kong University of Science and Technology

Aug. 2026 – Jun. 2027

Speech, Learning, and the Brain (SLaB) Lab; PI: Dr. Quentin Zhen Qin

RESEARCH INTERESTS

Speech production and perception; Mandarin lexical tones; speech aging; experimental phonetics; psycholinguistics and neurolinguistics.

PUBLICATIONS

Refereed Conference Proceedings

- Mao, Z., Li, C., & Li, S. (2024). Speech rate influence on rhythm alterations in Mandarin. In Proceedings of the 2024 IEEE 14th International Symposium on Chinese Spoken Language Processing (ISCSLP 2024) (pp. 521–525). https://doi.org/10.1109/ISCSLP63861.2024.10800471
- Li, Z., Mao, Z., Shen, S., Yuen, I., & Tang, P. (2024). The production of contrastive focus by 7- to 13-year-olds learning Mandarin Chinese. In Proceedings of Interspeech 2024 (pp. 4184–4188). https://doi.org/10.21437/Interspeech.2024-1611
- Li, C., Mao, Z., & Li, S. (2024). Analysis of normal and slow speech rate on the F0 contour of tones in Mandarin broadcasting speech. In Proceedings of the 2024 IEEE 14th International Symposium on Chinese Spoken Language Processing (ISCSLP 2024) (pp. 526–530). https://doi.org/10.1109/ISCSLP63861.2024.10799996

Accepted Conference Papers

- Mao, Z., Feng, Y., & Li, C. (2026). Age-related changes in Mandarin lexical tone production: Acoustic properties and tonal distinctiveness. Accepted by Interspeech 2026.

RESEARCH EXPERIENCE

Age-Related Changes in Mandarin Lexical Tone Production 2025 – 2026

Project Lead | Supervisor: Dr. Yan Feng

- Designed a Mandarin lexical tone production study comparing younger and older adults, with a focus on acoustic properties and tonal distinctiveness.
- Collected and processed speech production data from 78 native Mandarin speakers; extracted F0 contours and duration measures using Praat.
- Normalized F0 using speaker-specific T-value transformation and derived acoustic measures including pitch height, variability, range, onset, offset, slope, and duration.
- Conducted linear mixed-effects modeling, post-hoc comparisons, tone-space visualization, Bhattacharyya distance analysis, and SVM tone classification in R.
- Prepared figures, statistical summaries, and the manuscript accepted by Interspeech 2026.

Auditory Training for Mandarin Speech Perception in Older Adults 2025 – Present

Team Member | Supervisor: Dr. Yan Feng

- Reviewed literature on auditory training, categorical perception (CP), temporal order judgment, and speech perception in aging.
- Administered the full experimental procedure, including participant recruitment, pre-tests, auditory training, post-tests, and delayed post-tests.
- Implemented behavioral CP tasks for Mandarin lexical-tone and aspirated-consonant continua and assisted with EEG data collection using an auditory oddball paradigm.
- Analyzed behavioral training and CP data, including identification slope, category boundary, discrimination accuracy, and peakedness.
- Preprocessed EEG data and conducted ERP analyses of P1, N1, P2, and P300 responses to standard, within-category deviant, and between-category deviant stimuli.
- Developed the project into a B.A. thesis and contributed to an ongoing journal manuscript based on the study.

A Multidimensional Acoustic Study of Mandarin Speech Production in Normal Aging 2025 – Present

Project Lead | Supervisor: Dr. Yan Feng

- Developed a multidimensional acoustic study comparing Mandarin speech production between older and younger adults across isolated-word and connected-speech tasks.
- Recruited and tested 78 native Mandarin speakers and collected speech production data from both controlled isolated-word reading and semi-spontaneous picture-description tasks.
- Extracted and analyzed multidimensional acoustic measures across tone, vowel, consonant, voice quality, rhythm, speech rate, and pause dimensions.
- Conducted statistical analyses using mixed-effects models to examine age-related acoustic patterns and task-related differences in Mandarin speech production.
- Currently preparing a journal manuscript based on the project.

Mandarin Speech Rhythm Variation under Different Speech-Rate Conditions 2024

Project Lead | Supervisor: Dr. Shanpeng Li

- Conducted literature review on speech rate, Mandarin prosody, and duration-based rhythm metrics.
- Collected semi-spontaneous speech materials from CCTV news broadcasts through web-based data retrieval and audio processing.
- Prepared the speech corpus for Montreal Forced Aligner (MFA), performed forced alignment, and post-processed TextGrid outputs into pinyin-based phone labels.
- Manually checked and corrected consonant and vowel boundaries in Praat.
- Extracted and analyzed rhythm-related acoustic measures, including %V, nPVI_V, ΔC, and rPVI_C, under normal and slow speech-rate conditions.
- Conducted statistical analyses using linear mixed-effects models in R, prepared figures and tables, and wrote the manuscript published in ISCSLP 2024 proceedings.

F0 Contour of Mandarin Tones under Normal and Slow Speech Rates 2024

Team Member | Supervisor: Dr. Shanpeng Li

- Assisted with literature review, CCTV broadcast-speech corpus collection, and annotation of Mandarin tone materials under normal and slow speech-rate conditions.
- Contributed to acoustic extraction and analysis of F0 contour measures across the four Mandarin lexical tones.
- Assisted with statistical analysis using linear mixed-effects modeling and growth curve analysis to examine speech-rate effects on mean F0 and tonal contour shape.
- Contributed to result interpretation and manuscript preparation for a paper published in ISCSLP 2024 proceedings.

Contrastive Focus Production in Child Learners of Mandarin Chinese 2024

Team Member | Supervisor: Dr. Ping Tang

- Annotated children's and adults' Mandarin contrastive-focus productions and assisted with perceptual-judgment data organization.
- Led statistical analyses in R, including generalized linear mixed-effects models for perceived focus accuracy and linear mixed-effects models for acoustic measures.
- Analyzed F0 range and duration patterns in focal and post-focal syllables to examine children's acoustic implementation of contrastive focus.
- Contributed to result interpretation and wrote the results-related sections for a paper published in Interspeech 2024 proceedings.

INDUSTRY EXPERIENCE

iFLYTEK Co., Ltd. (Hefei, China)

Jul. 2024 – Aug. 2024

Junior Resource Technology Engineer

- Built Python web-scraping scripts to collect and clean training data for iFLYTEK's Spark Cognitive Large Language Model.
- Conducted quality checks on structured and unstructured training data and filtered low-quality samples to improve dataset reliability.

HONOURS AND AWARDS

Travel Grants

- ISCSLP 2024 Travel Grant Award, IEEE 14th International Symposium on Chinese Spoken Language Processing, 2024.

Honours and Scholarships

- Outstanding Graduate, Nanjing University of Science and Technology, 2025.
- Grand Prize Scholarship, Nanjing University of Science and Technology, 2022.
- First-Class Scholarship, Nanjing University of Science and Technology, 2022, 2023.
- Second-Class Scholarship, Nanjing University of Science and Technology, 2024.

Leadership and Service

- Class President, Linguistics Class of 2021, 2021–2025; Assistant Counsellor, Class of 2023, 2023–2024.

SKILLS

- Phonetics and acoustic analysis: Praat; Montreal Forced Aligner (MFA)
- Experimental design and stimulus manipulation: E-Prime; PsychoPy; STRAIGHT/TANDEM-STRAIGHT in MATLAB
- EEG: BrainProducts Recorder; BrainProducts Analyzer; EEGLAB/ERPLAB in MATLAB; MNE-Python
- Programming and statistical analysis: R; MATLAB; Python; SPSS
- Language proficiency: Mandarin Chinese (native); English (TEM-8, IELTS 6.5)