

# HUANG Po-Hsuan

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## ACADEMICS

2020–2023 **National Taiwan University** GPA 4.19/4.3  
**MA in Linguistics**

Relevant courses: Introduction to Syntax; Introduction to Phonology; Linguistic Fieldwork; Advanced Phonetics; Seminar on Cognitive Linguistics and Psychology; Special Topics on Text Mining and Natural Language Processing; Introduction to Psycholinguistics; Introduction to French Linguistics; Second Language Acquisition; Chinese Phonology; The Use of Ultrasound for Linguistic Research; Language and Society; Physiological Basis and Functions in Speech Production; Research Methodology; Data Analysis and Machine Learning with Python

2015–2020 **National Chengchi University** GPA 4.00/4.3  
**BAs in English**

**European Languages and Cultures  
(Division of French Language and Culture)**

Relevant courses: Introduction to Linguistics; Syntax; Introduction to Phonology; Language and Cognition; Development of the English Language; Conference Presentation and Journal Publication

## RESEARCH EXPERIENCE

**Speech Behavior and Science Lab (PI: Dr. Chenhao Chiu)**

**Graduate Institute of Linguistics  
National Taiwan University**

Lab Member & Research Assistant

*July, 2021–*

Notable projects

**High/low vowel differences in laryngeal height and EGG amplitude for different tones**

- Supervised lab interns on experiment design, experiment conduction, and analyses.
- Developed pipelines for data analysis and visualization for multi-channel data.

**Lip postures of Taiwan Mandarin High vowels**

- Developed automated face recognition for linguistic purposes with MediaPipe.
- Designed automated lip landmark tracing for side faces with cluster analysis.

**Squliq Atayal corpus construction**

- Labeled 20-hour-long recordings of Squliq Atayal produced by one female informant.
- Cataloged the sound inventory of Squliq Atayal.
- Assisted Squliq Atayal speech auto-segmentation.

**Prof. Hsuan-Lei Shao**

**Research Center for Digital Law  
National Taiwan University**

Research Assistant

*August, 2023–*

Projects

**Legal judgment similarity computation**

- Devised a novel similarity computation based on graph analysis of textual data.
- Overcame the lack of prior-case citations in the continental law system.

**Association-rule-based domain-specific collocation extraction**

- Extracted domain-specific collocations in two different corpora (legal judgments and political talks) through iterative word re-segmentation based on (average) MI (mutual information).
- Devised an algorithm for (average) MI threshold determination based on mean sentential word ratios and the elbow method.
- Built a package that performs calculation of (average) MI for adjacent bigrams, re-segmentation of the original sentences, and visualization of the sentences as binary trees.

**Prof. Te-Hsin Liu**

**Graduate Program of Teaching Chinese as a Second Language  
National Taiwan University**

Research Assistant

*July, 2021–October, 2022*

Project

**Interaction between L1 transfer and universal constraints for French-speaking Mandarin L2 learners**

- Conducted thorough literature reviews for weekly seminars.
- Devised and conducted suitable statistical analyses for the corpus data.

**Prof. One-Soon Her**

**Graduate Institute of Linguistics  
National Chengchi University**

Research student

*June, 2018–July, 2020*

Project

**Classification of Paiwan questions**

- Conducted a thorough literature review.
- Conducted thorough fieldwork.
- Visualized the prosodic patterns of the collected materials.
- Authored a journal paper.

### **Thesis**

#### **Production and perception of tonal coarticulation in Taiwan Mandarin and Taiwan Southern Min**

- Conducted a thorough literature review and found research gaps.
- Formulated hypotheses pertaining to the research gaps and designed experiments to validate these hypotheses.
- Independently completed three large-scale experiments.
- Devised and conducted suitable statistical analyses for the experiment data.
- Provided explanation for the experiment results.
- Authored a journal paper (in preparation).

### **Course/Personal Projects**

#### **Ultrasonic-and-optical-imaging-assisted automated speech correctness judgment model**

##### **Data Analysis and Machine Learning with Python**

Lecturer: Prof. Tommy C.Y. Ho

Fall semester, 2023

- Conducted a thorough literature review on unfamiliar areas and found research gaps.
- Applied newly learned knowledge and skills to existing expertise; integrated distinct fields with linguistics.
- Designed a sophisticated neural network structure that combines two different forms of data, with a sound identification accuracy of 83%.

#### **Word networks for ill-formed versus well-formed documents in Taiwan Mandarin**

##### **Special Topics on Text Mining and Natural Language Processing**

Lecturer: Prof. Hsuan-Lei Shao

Fall semester, 2023

- Devised a pipeline to collect documents to form corpora with a static web crawler.
- Self-taught word-embedding-related techniques.
- Built a word2vec model based on 1 million documents.
- Conducted a thorough literature review on unfamiliar areas and found research gaps.
- Applied word networks to graph analyses.
- Developed a novel kind of word network based on word similarity and compared its properties with conventional word co-occurrence networks.

## **TEACHING EXPERIENCE**

### **Technology of Brain Science**

Lecturers: Prof. Joshua G.O. Soo & Prof. Chia-Lin Lee

Teaching Assistant

- Supervised students' term project progress.
- Provided students with coding assistance.
- Evaluated and graded students.

### **Graduate Institute of Brain and Mind Sciences**

**National Taiwan University**

*Spring semester, 2023*

### **Uncovering Languages**

Lecturer: Prof. Chenhao Chiu

Teaching Assistant

- Supervised students' term project progress.
- Provided students with coding assistance.
- Designed pop-up quizzes and mid-term exams.
- Supervised and led student's discussions in weekly tutorials.
- Evaluated and graded students.
- Prepared class materials.

### **Graduate Institute of Linguistics**

**National Taiwan University**

*Spring semester, 2023*

*Spring semester, 2022*

### **Freshman English**

Lecturer: Prof. Wen-Hsien Hsu

Teaching Assistant

- Gave oral presentation tutorials and example presentations.
- Supervised student's mid-term and final presentations.
- Evaluated and graded students.

### **Department of Foreign Languages and Literatures**

**National Taiwan University**

*Spring semester, 2021*

*Fall semester, 2020*

- Prepared class materials.

## PUBLICATIONS

### Peer-reviewed Journal Articles

Huang, Po-Hsuan and Her, One-Soon. 2023. On a dichotomy of question types: The case of Paiwan. *Concentric: Studies in Linguistics*. To appear.

### Selected Conference Articles

Huang, Po-Hsuan and Liu, Yi-Chen. 2023, October 21. Ultrasonic-and-optical-imaging-assisted automated speech correctness judgment model. Tunghai International Conference on Second Language Teaching and Research (SLTR.THU). Taichung, Taiwan.

Chiu, Chenhao and Huang, Po-Hsuan. 2023, August 7–11. Lip postures of high vowels in Taiwan Mandarin. International Congress of Phonetic Sciences (ICPhS). Prague, Czech.

Huang, Po-Hsuan and Chiu, Chenhao. 2023, August 7–11. Perception of coarticulated tones in Taiwan Mandarin and Taiwan Southern Min. International Congress of Phonetic Sciences (ICPhS). Prague, Czech. [Poster]

Huang, Po-Hsuan and Chiu, Chenhao. 2023, May 26–27. Tonal coarticulation in Taiwan Mandarin and Taiwan Southern Min. Hanyang International Symposium on Phonetics and Cognitive Sciences of Language (HisPhonCog). Seoul, Korea. [Poster]

Wang, Chi-Wei, Chen, Bo-Wei, Huang, Po-Hsuan, Lai, Ching-Hung, and Chiu, Chenhao. 2023, May 26–27. Evaluating forced alignment for under-resourced languages: A test on Sguliq Atayal. Hanyang International Symposium on Phonetics and Cognitive Sciences of Language (HisPhonCog). Seoul, Korea. [Poster]

Huang, Po-Hsuan and Chiu, Chenhao. 2022, November 3–4. Articulation and syllabic affiliation of prenuclear glide in Taiwan Mandarin. Ultrafest X: Conference on Ultrasound Imaging for Speech and Language Research. Manchester, United Kingdom.

Huang, Po-Hsuan, Lai, Ching-Hung and Liu, Te-Hsin. 2022, September 23–25. On the interaction between L1 Transfer and universal constraints – Evidence from the acquisition of Mandarin tones by French speakers. North American Conference on Chinese Linguistics (NACCL). Bloomington, IN, United States.

Huang, Po-Hsuan and Chiu, Chenhao. 2022, January 6–9. Vowel-glide distinction in high vocoid diphthong structures in Sguliq Atayal: An ultrasound and acoustic study. Annual Meeting of the Linguistic Society of America (AML). Washington, DC, United States. [Poster]

Huang, Po-Hsuan. 2021, October, 23. Vowel-glide distinction in high vocoid diphthong structures in Sguliq Atayal: An ultrasound and acoustic study. National Conference on Linguistics (NCL). Taipei, Taiwan.

Huang, Po-Hsuan and Her, One-Soon. 2021, October 15–16. On a two-way distinction of questions in Paiwan. Young Scholars' Symposium on Taiwan Languages (YSSTL). Online.

### Works in progress

Huang, Po-Hsuan and Chiu, Chenhao. Production and perception of tonal coarticulation: The cases of Taiwan Mandarin and Taiwan Southern Min. Submitted.

Huang, Po-Hsuan and Shao, Hsuan-Lei. Comparison between the structures of word co-occurrence and word similarity networks for ill-formed and well-formed texts in Taiwan Mandarin. Manuscript.

Huang, Po-Hsuan and Shao, Hsuan-Lei. Domain-specific collocation extraction in Mandarin based on iterative average mutual information. In preparation.

Huang, Po-Hsuan. Production and perception of tonal coarticulation through computational communication simulation. In preparation.

Huang, Po-Hsuan. Improving text classification with construction embedding. In preparation.

## INVITED TALKS

Electroglottography in linguistics research with Python, Institute of Linguistics, Academia Sinica, Taipei	March, 2024
Face extraction with MediaPipe in linguistics research, Speech Behaviours and Speech Sciences In-class Talk, Taipei	October, 2023
Face extraction with MediaPipe in linguistics research, MultiMoco NTU Workshop, Taipei	November, 2022
Using PCA and LDA for ultrasound image classification, the 1 <sup>st</sup> NTU GIL Ultrasound Workshop, Taipei	November, 2021

## SERVICE & ACTIVITIES

Organizer, Education Camp for Rural Schools, NCCU	February–August, 2017
President of Activity, Changhua Student's Association, NCCU	July, 2017–June, 2018
Vice organizer, Education Camp for Rural Schools, NCCU	September, 2016–January, 2017
Leading actor, Concours universitaire national de théâtre, Taiwan	May, 2017
Project manager, Education Camp for Rural Schools, NCCU	August, 2016
Voluntary after-school tutor, Wanhshing Elementary School, Taipei	Spring semester, 2016

## SKILLS & KNOWLEDGE

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Languages: Mandarin (native); Southern Min (native); English (advanced); French (advanced); Spanish (basic)

Programming languages/software: Python; R; Javascript; Praat Script; Psychopy; E-Prime; Matlab; bash, Swift

Packages/modules:

- Data analyses: *numpy*; *scikit-learn*; *statsmodels*; *pandas*; *network*; *lme4*
- Visualization: *matplotlib*; *seaborn*; *Plotly*
- Image processing: *OpenCV*; *MediaPipe*; *FFmpeg*
- Acoustic analyses: *parselmouth*; *wave*
- Text mining: *jieba*; *ckip*; *gensim*
- Others: *tensorflow*; *PyTorch*; *tkinter*; *PyPI*; *pickle*; *cython*; *git*

Statistical analyses: fundamental analyses (t-test, ANOVA, etc.); dimensionality reduction (PCA, LDA, t-SNE, etc.); regression/modeling (linear/logistic regression, LMM, GLM, GAMM, etc.); cluster analysis (hierarchical; K-Means, etc.); correlation-related analyses (fundamental correlation analyses, CCA, Apriori Algorithm, mutual information, label ranking average precision scores, etc.); basic graph analyses

Data structures & Algorithms: linked list, tree, array, A\* pathfinding, Levenshtein distance

Machine learning: linear/logistic regression; SVM; decision tree; random forest; KNN; neural networks (CNN, spatial-transformer network, RNN, GAN, etc.); neural agent simulation

Laboratory instrumentation: ultrasound; electromyography; electroglottography