

# HUANG Po-Hsuan

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## ACADEMICS

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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

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**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 in 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 (under review).

## **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 vectorization.
- 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.

### **Simulated production and perception of tonal coarticulation through communication neural agents**

- Developed speaker/listener neural agents in tone communication.
- Self-taught related deep learning knowledge, including multilayer perceptrons and communication networks.
- Successfully induced human-like behaviors, including perceptual normalization and avoidance of coarticulation based on different tone distributions.

## **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.

### **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.

### **Freshman English**

Lecturer: Prof. Wen-Hsien Hsu

Teaching Assistant

- Gave oral presentation tutorials and example presentations.

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

**National Taiwan University**

*Spring semester, 2023*

### **Graduate Institute of Linguistics**

**National Taiwan University**

*Spring semester, 2022/2023*

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

**National Taiwan University**

*Fall semester, 2020/Spring semester, 2021*

- Supervised student's mid-term and final presentations.
- Evaluated and graded students.
- Prepared class materials.

## PUBLICATIONS

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### Peer-reviewed Journal Articles

- Huang, Po-Hsuan and Her, One-Soon. To appear. On a dichotomy of question types: The case of Paiwan. *Concentric: Studies in Linguistics*. [pdf](#)
- Huang, Po-Hsuan and Chiu, Chenhao. Under review. Production and perception of tonal coarticulation: The cases of Taiwan Mandarin and Taiwan Southern Min. *Journal of Phonetics*.

### Selected Conference Articles

- Chiu, Chenhao, Huang, Jianzhi and Huang, Po-Hsuan. 2023, December 4–8. Perceptual identification of high vowels in Taiwan Mandarin. Acoustics 2023 Conference. Sydney, Australia. [pdf](#)
- 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. [pdf](#)
- 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. [pdf](#)
- 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] [pdf](#)
- 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] [pdf](#)
- 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 Squliq Atayal. Hanyang International Symposium on Phonetics and Cognitive Sciences of Language (HisPhonCog). Seoul, Korea. [Poster] [pdf](#)
- 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. [pdf](#)
- 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. [pdf](#)
- Huang, Po-Hsuan and Chiu, Chenhao. 2022, January 6–9. Vowel-glide distinction in high vocoid diphthong structures in Squliq Atayal: An ultrasound and acoustic study. Annual Meeting of the Linguistic Society of America (AML). Washington, DC, United States. [Poster] [pdf](#)
- Huang, Po-Hsuan. 2021, October, 23. Vowel-glide distinction in high vocoid diphthong structures in Squliq Atayal: An ultrasound and acoustic study. National Conference on Linguistics (NCL). Taipei, Taiwan. [pdf](#)
- 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. [pdf](#)

### Works in progress

- Huang, Po-Hsuan. Production and perception of tonal coarticulation through computational communication simulation. Manuscript. [pdf](#)
- 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. [pdf](#)
- Huang, Po-Hsuan and Shao, Hsuan-Lei. Iterated domain-specific collocation extraction through mutual information in Mandarin. Manuscript. [pdf](#)
- Huang, Po-Hsuan. Improving text classification with construction embedding. In preparation.

## INVITED TALKS

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

## SERVICE & ACTIVITIES

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|---|------------------------------|
| Organizer, Education Camp for Rural Schools, NCCU         | <i>February–August, 2017</i> |
| President of Activity, Changhua Student Association, NCCU | <i>July, 2017–June, 2018</i> |

Vice organizer, Education Camp for Rural Schools, NCCU  
Leading actor, Concours universitaire national de théâtre, Taiwan  
Project manager, Education Camp for Rural Schools, NCCU  
Voluntary after-school tutor, Wanhshing Elementary School, Taipei

*September, 2016–January, 2017*  
*May, 2017*  
*August, 2016*  
*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; SQL; 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