

MATTHEW KING-HANG MA

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EDUCATION

- 2023 **The Chinese University of Hong Kong, PhD**
 Electronic Engineering, DSP & Speech Technology Laboratory (DSP-STL).
- 2015 **The Chinese University of Hong Kong, BEng (First-Class Honours)**
 Biomedical Engineering.

WORK EXPERIENCES

- 03/2023 – Present **The Hong Kong Polytechnic University, Postdoctoral Fellow**
 Research Centre for Language, Cognition and Neuroscience, Department of
 Language Science and Technology
 PolyU Distinguished Postdoctoral Fellow
 HKRGC Postdoctoral Fellow
- 02/2023 – 03/2023 **The Hong Kong Polytechnic University, Research Associate**
 Research Centre for Language, Cognition and Neuroscience, Department of
 Chinese and Bilingual Studies
- 08/2015 – 07/2016 **The Chinese University of Hong Kong, Research Assistant**
 DSP & Speech Technology Laboratory (DSP-STL), Department of Electronic
 Engineering

MANUSCRIPTS IN PROGRESS

- 2025 **Ma, M. K-H.**, Fong, M. C.-M., & Wang, W. S. (2025). *A Path Toward Reproducibility: A Dual Perspective on Resting-State EEG Network Characteristics*. Submitted to ISBI2026.
- 2025 **Ma, M. K.-H.**, Fong, M. C.-M., Feng, Y., Li, C. P.-H., & Wang, W. S. (2025). *More than a feeling: Expressive style influences cortical speech tracking in subjective cognitive decline* (No. arXiv:2509.21277). arXiv. Submitted to ICASSP2026.
- 2025 Wang, B., **Ma, M. K-H.**, Huang, S. (2025). *Evidential Value of Cantonese Filled Pause in Forensic Voice Comparison – A comparison between acoustic phonetic and automatic speaker recognition systems*. Submitted to Journal of Phonetics.

GRANT/FUNDING

- 2025 **Departmental Collaborative Research Fund (DCRF) (HKPolyU, 2025 – 2028, \$500,000)**: The effects of combined tDCS and conversation therapy on language and cognitive performance of people with mild cognitive impairment with integration of a multimodal analyzer.
 - PI: Prof. WONG Min Ney.

- Served as Co-I.
- 2023 **HKRGC Postdoctoral Fellowship Scheme (HKRGC, 2023 – 2026, \$1351,352):** Attention and Attrition: Neural Speech Tracking of L1 and L2 Speech in Ageing Bilinguals.
- PI: Prof. WANG William Shiyuan
 - Conceptualized the study, wrote the proposal, and conducted all primary research and analysis.
- 2022 **Inter-Faculty Collaboration Scheme for FH, FHSS and FENG (HKPolyU, 2022 – 2024, \$489,934):** What can we learn of subjective cognitive decline (SCD) from discourse comprehension? A neural speech tracking study.
- PI: Prof. WANG William Shiyuan
 - Conceptualized the study, wrote the proposal, and conducted all primary research and analysis.
- 2021 **Dean's Reserve (HKPolyU, 2021 – 2023, \$100,000):** Complexity of electroencephalographic responses to speech and music: a comparison between patients with Alzheimer's disease and cognitively normal adults.
- PI: Prof. WANG William Shiyuan
 - Conceptualized the study, wrote the proposal, and conducted all primary research and analysis.

SELECTED PUBLICATIONS

- 2025 **Ma, M. K.-H.***, Xie, C.*., Wang, W., & Wang, W. S. (2025). Exploring Layer-wise Representations of English and Chinese Homonymy in Pre-trained Language Models. *Findings of the Association for Computational Linguistics: ACL 2025*, 19705–19724.
- 2025 Xie, C.*., **Ma, M. K.-H.***, Wang, W., & Wang, W. S. (2025). Context and POS in Action: A Comparative Study of Chinese Homonym Disambiguation in Human and Language Models. In C. Christodoulopoulos, T. Chakraborty, C. Rose, & V. Peng (Eds.), *Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing* (pp. 27596–27613). Association for Computational Linguistics.
- 2025 **Ma, M. K-H.**, Fong, M. C.-M., & Wang, W. S. (2025). A reliability study in resting-state EEG network characteristics: frequency of interest, number of oscillatory cycles and thresholding. *2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*.
- 2025 Rilliard, A. de Moraes, J. A., Erickson, D. Guerry, M., Hönenmann, A., Lee, T., **Ma, M. K-H.**, Mixdorff, H., Rao, P., Shochi, T. (2025). Cross-cultural dimensions organizing prosodic attitudes reception: a meta-analysis of free labeling studies. *Journal of Speech Sciences*, 14(00), e025012.
- 2025 Fong, M. C.-M., **Ma, M. K.-H.**, Ng, X. S.-W., Liu, J. C. H., Waye, M. M. Y., Chien, W. T., & Wang, W. S. (2025). Regional Brain Age Measures Based on Convolutional Neural Networks (CNNs)—Symmetry Properties and Associations with Fluid and Crystallized Intelligence. *2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*.
- 2024 Wang, J., Wang, S., Fong, M. C.-M., **Ma, M. K. H.**, & Wang, W. S. Y. (2024). What Can Complex Systems Theory Tell Us About Understanding in the Human–AI

- Communication System? *2024 6th International Conference on Natural Language Processing (ICNLP)*, 650–656.
- 2023 **Ma, M. K.-H.** (2023). Six-Year Longitudinal Changes in EEG Spectral Characteristics of a Healthy Older Individual. In *Inspirations from a Lofty Mountain: Festschrift in Honor of Professor William S.-Y. Wang on his 90th Birthday*.
- 2023 Xie, C., Fong, M. C.-M., **Ma, M. K.-H.**, Wang, J., & Wang, W. S. (2023). The retrogenesis of age-related decline in declarative and procedural memory. *Frontiers in Psychology*, 14.
- 2022 Fong, M. C.-M., **Ma, M. K.-H.**, Chui, J. Y. T., Law, T. S. T., Hui, N.-Y., Au, A., & Wang, W. S. (2022). Foreign language learning in older adults: anatomical and cognitive markers of vocabulary learning success. *Frontiers in Human Neuroscience*, 16, 787413.
- 2021 **Ma, M. K.-H.**, Fong, M. C.-M., Xie, C., Lee, T., Chen, G., & Wang, W. S. (2021). Regularity and randomness in ageing: Differences in resting-state EEG complexity measured by largest Lyapunov exponent. *Neuroimage: Reports*, 1(4), 100054.
- 2021 Fong, M. C.-M., Law, T. S.-T., **Ma, M. K.-H.**, Hui, N. Y., & Wang, W. S. (2021). Can inhibition deficit hypothesis account for age-related differences in semantic fluency? Converging evidence from Stroop color and word test and an ERP flanker task. *Brain and Language*, 218, 104952.
- 2020 **Ma, M. K.-H.**, Lee, T., Fong, M. C.-M., & Wang, W. S. (2020). Resting-State EEG-Based Biometrics with Signals Features Extracted by Multivariate Empirical Mode Decomposition. *ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 991–995.
- 2020 Fong, M. C.-M., Hui, N. Y., Fung, E. S.-W., **Ma, M. K.-H.**, Law, T. S.-T., Wang, X., & Wang, W. S. (2020). Which cognitive functions subserve clustering and switching in category fluency? Generalisations from an extended set of semantic categories using linear mixed-effects modelling. *Quarterly Journal of Experimental Psychology*, 73(12), 2132–2147
- 2018 Mixdorff, H., Rilliard, A., Lee, T., **Ma, M. K. H.**, & Hönenmann, A. (2018). Cross-cultural (A)symmetries in Audio-visual Attitude Perception. *Interspeech 2018*, 426–430.
- 2018 Lee, T., **Ma, K. H. M.**, Rilliard, A., Mixdorff, H., & Hönenmann, A. (2018). Free Labeling of Audio-visual Attitudinal Expressions in Cantonese. *Speech Prosody 2018*, 483–487.
- 2017 Mixdorff, H., Hönenmann, A., Rilliard, A., Lee, T., & **Ma, M.** (2017). Cross-Language Perception of Audio-visual Attitudinal Expressions. *The 14th International Conference on Auditory-Visual Speech Processing*, 119–124.
- 2017 Mixdorff, H., Hönenmann, A., Rilliard, A., Lee, T., & **Ma, M. K.** (2017). Audio-visual expressions of attitude: How many different attitudes can perceivers decode? *Speech Communication*, 95, 114–126.

-INVITED TALKS

2024

Introduction to EEG/ERP analysis. CBS596 *Neurolinguistics*. HKPolyU.

2023

Age-related trajectory of resting-state EEG: spectral characteristics and signal complexity. *1st RISA Symposium on Brain Ageing, Imaging and Stimulation. HKPolyU.*

TEACHING

Fall 2019

Signal and Systems (Teaching Assistant). Instructor: Prof. LEE Tan. CUHK.

Fall 2018

Introduction to Embedded System (Teaching Assistant). Instructor: Mr. YIP Kim Fung. CUHK.

Spring 2017

Introduction to Electric Power Systems (Teaching Assistant). Instructor: Prof. LOH, Poh Chiang. CUHK.

Fall 2016

Signal and Systems (Teaching Assistant). Instructor: Prof. LEE Tan. CUHK.

SELECTED ORAL/POSTER PRESENTATIONS

2023

Ma, M. K.-H., Fong, M. C.-M., & Wang, W. S. (2023, May 8). *Lempel-Ziv complexity shows inverted U-shaped pattern across the adult lifespan* [Poster]. PolyU Academy for Interdisciplinary Research (PAIR) Conference, Hong Kong.

2023

Ma, M. K.-H., Fong, M. C.-M., Lee, T., & Wang, W. S. (2023, August 20). *Resting-state EEG complexity: Antagonistic associations with cognition pre- and post-middle age* [Oral]. BrainConnects2023, Ho Chi Minh City, Vietnam.

2022

Ma, M. K.-H., Fong, M. C.-M., Lee, T., & Wang, W. S. (2022, August 8). *Disentangling broadband EEG microstates into frequency-specific features of ageing* [Poster]. BrainConnects2022, Nagoya, Japan.

2020

Ma, M. K.-H., Lee, T., Fong, M. C.-M., & Wang, W. S. (2020, May 2). *Using multivariate empirical mode decomposition to analyze broad-band EEG microstates*. 27th Annual Meeting, Cognitive Neuroscience Society, San Francisco, United States.

2019

Ma, M. K.-H., Lee, T., Fong, M. C.-M., Hui, N. Y., & Wang, W. S. (2019, March 23). *Reliability of resting-state EEG spectral power—Advantage of normalization is not guaranteed* [Poster]. 26th Annual Meeting, Cognitive Neuroscience Society, San Francisco, United States.

SELECTED AWARDS

2023

HKRGC Postdoctoral Fellowship, Hong Kong Research Grant Council

2023

PolyU Distinguished Postdoctoral Fellowship, HKPolyU

2023

Young Investigator Award, BrainConnects2023

2022

CUHK Outstanding Student Award, CUHK

2022

Excellent Presentation Award, BrainConnects2022

2020

Endeavour Merit Award 2019/2020, Hong Kong Government Scholarship Fund

2020

PCCW-HKT Scholarship, PCCW

2020

Tutor with Commendation, CUHK

UNIVERSITY AND COMMUNITY SERVICES

2022

Initiated and participated in a rehabilitation project to assist patients with their vocal cord removed as a part of treatment of their tongue, laryngeal or esophageal cancers. The team successfully delivered a deep learning text-to-speech system to synthesize the patients' voice. The project has been reported by local television programme [1].

[1] 【小事大意義】留住媽媽聲線：患舌癌須切除聲帶 大學團隊用AI 為兒子留住媽媽聲線. (2022, June 3). i-CABLE.

2019

**Hong Kong Primary and Secondary Schools STEM Robotics Competition 2019
(Student Organizer), CUHK**