Xufeng Duan

Email   Google Scholar   Personal Website

Research interests: Psycholinguistics, Neurolinguistics, Mechanistic Interpretability

Working Experience

The Chinese University of Hong Kong	2025–Present
Brain and Mind Institute	*Research Assistant Professor*

Education

The Chinese University of Hong Kong	2020–2025
Department of Linguistics and Modern Languages	*Ph.D.* in Linguistics
The Chinese University of Hong Kong	2019–2020
Department of Linguistics and Modern Languages	*M.A.* in Linguistics
Sun Yat-sen University	2015–2019
Neurolinguistics Laboratory	*B.A.* in Chinese

Research Projects

- Participate, General Research Fund 2021/22 (14613722), *Neurocognitive mechanisms of character amnesia in Chinese handwriting*, RGC, HK\$803,050, 01/01/2023 – 31/12/2025. PI: Zhenguang Cai (CUHK).

- Participate, Strategic Partnership Award for Research Collaboration, *Chinese handwriting in the digital age: neurocognitive mechanisms of character amnesia*, The Chinese University of Hong Kong, HK\$150,000, 02/2022 – 01/2023. PIs: Zhenguang Cai (CUHK) and Joseph Devlin (UCL).

Publication

Tang, X., **Duan, X.**, & Cai, Z. G. (2025). Large Language Models for Automated Literature Review: An Evaluation of Reference Generation, Abstract Writing, and Review Composition. *In Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing (EMNLP), Main Conference*. arXiv:2412.13612

Zhao, N., & **Duan, X.** (2025). Enhancing Conference Interpreting with Computer-assisted Interpreting Tools: A Multi-agent System.

Zhao, N., **Duan, X.**, & Cai, Z. G. (in press). The missing half of language learning in current developmental language models: Exogenous and endogenous linguistic input. *Open Mind*.

Duan, X., Yao, Z., Zhang, Y., Wang, S., & Cai, Z. G. (2025). How syntax specialization emerges in language models. *arXiv preprint*. 10.48550/arXiv.2505.19548

Xiao, B., **Duan, X.**, Haslett, D. A., & Cai, Z. G. (2025). Human-likeness of LLMs in the Mental Lexicon. *Proceedings of the 29th Conference on Computational Natural Language Learning* (pp. 586–601). Vienna, Austria: Association for Computational Linguistics. 2025.conll-1.38

Qiu, Z., **Duan, X.**, & Cai, Z. G. (2025). Grammaticality representation in ChatGPT as compared to linguists and laypeople. *Humanities and Social Sciences Communications*, 12(1), 1–15. 10.1057/s41599-025-04907-8

Wang, S., **Duan, X.**, & Cai, Z. (2025). What to predict? Exploring how sentence structure influences contrast predictions in humans and large language models. In T. Kuribayashi, G. Rambelli, E. Takmaz, P. Wicke, J. Li, & B.-D. Oh (Eds.), *Proceedings of the Workshop on Cognitive Modeling and Computational Linguistics* (pp. 244–252). NAACL 2025. 2025.cmcl-1.28

Wu, H., **Duan, X.**, & Cai, Z. (2025). Distinct social-linguistic processing between humans and large audio-language models: Evidence from model-brain alignment. In T. Kuribayashi, G. Rambelli, E. Takmaz, P. Wicke, J. Li, & B.-D. Oh (Eds.), *Proceedings of the Workshop on Cognitive Modeling and Computational Linguistics* (pp. 135–143). NAACL 2025. 2025.cmcl-1.18

Duan, X., Li, S., & Cai, Z. G. (2025). MacBehaviour: An R package for behavioural experimentation on large language models. *Behavior Research Methods*, 57(1), 19. 10.3758/s13428-024-02524-y

Duan, X., Zhou, X., Xiao, B., & Cai, Z. (2025). Unveiling language competence neurons: A psycholinguistic approach to model interpretability. In O. Rambow, L. Wanner, M. Apidianaki, H. Al-Khalifa, B. D. Eugenio, & S. Schockaert (Eds.), *Proceedings of the 31st International Conference on Computational Linguistics* (pp. 10148–10157). Association for Computational Linguistics. https://aclanthology.org/2025.coling-main.677

Zhou, X., Chen, D., Cahyawijaya, S., **Duan, X.**, & Cai, Z. G. (2025). Linguistic Minimal Pairs Elicit Linguistic Similarity in Large Language Models. *Proceedings of the 31st International Conference on Computational Linguistics* (pp. 6866–6888). Association for Computational Linguistics. https://aclanthology.org/2025.coling-main.459

*Wang, S., ***Duan, X.**, & Cai, Z. (2024). A Multimodal Large Language Model "Foresees" Objects Based on Verb Information but Not Gender. *Proceedings of the 28th Conference on Computational Natural Language Learning* (pp. 435–441). 10.18653/v1/2024.conll-1.32

Qiu, Z., **Duan, X.**, & Cai, Z. (2024). Evaluating Grammatical Well-Formedness in Large Language Models: A Comparative Study with Human Judgments. *Proceedings of the Workshop on Cognitive Modeling and Computational Linguistics* (pp. 189–198). 10.18653/v1/2024.cmcl-1.16

Duan, X., Xiao, B., Tang, X., & Cai, Z. G. (2024). HLB: Benchmarking LLMs' Humanlikeness in Language Use. *arXiv:2409.15890 [cs.CL]*. 10.48550/arXiv.2409.15890

Duan, X., & Cai, Z. G. (2024). Chinese Character Processing. *Oxford Research Encyclopedia of Linguistics*. Oxford University Press. 9780199384655.013.1012

Wu, H., **Duan, X.**, & Cai, Z. G. (2024). Speaker Demographics Modulate Listeners' Neural Correlates of Spoken Word Processing. *Journal of Cognitive Neuroscience*, 36(10), 2208–2226. 10.1162/jocn_-a_02225

Cai, Z., **Duan, X.**, Haslett, D., Wang, S., & Pickering, M. (2024). Do large language models resemble humans in language use? *Proceedings of the Workshop on Cognitive Modeling and Computational Linguistics* (pp. 37–56). 10.18653/v1/2024.cmcl-1.4

Qiu, Z., **Duan, X.**, & Cai, Z. (2023). Does ChatGPT Resemble Humans in Processing Implicatures? *Proceedings of the 4th Natural Logic Meets Machine Learning Workshop* (pp. 25–34). https://aclanthology.org/2023.naloma-1.3

Lu, S., **Duan, X.**, & Li, X. (2021). Prominence and Locality Principle in Chinese Possessive Topicalization Sentences and its Psychological Basis——Evidence from eye-movements. *Contemporary Linguistics*, 23(1), 56–73. [pdf]

Conference Talk

Xufeng Duan (2024). The Neural Basis of Decline in Written Production: Evidence from Chinese Handwriting. *The annual meeting of Society for the Neurobiology of Language (SNL)*, Brisbane, Australia.

Xufeng Duan (2024). MacBehaviour: An R package for behavioural experimentation on large language models. *Architectures and Mechanisms for Language Processing Asia (AMLaP Asia)*, Singapore.

Xufeng Duan (2024). Humanlike language use in LLMs. *CogSci Hong Kong Meetup*, Hong Kong.

Xufeng Duan (2023). Chinese translations of English words: A comparison between human and ChatGPT translations. *Architectures and Mechanisms for Language Processing Asia (AMLaP Asia)*,

Hong Kong, China.

Zhenguang Cai, **Xufeng Duan**, Lu Sun, & Martin Pickering (2023). Structural priming in ChatGPT. *Architectures and Mechanisms for Language Processing Asia (AMLaP Asia)*, Hong Kong, China.

Zhenguang Cai, **Xufeng Duan**, David Haslett, Shuqi Wang, & Martin Pickering (2023). Do language models resemble humans in language use? *Architectures and Mechanisms for Language Processing (AMLaP)*, Donostia-San Sebastián, Spain.

Zhuang Qiu, **Xufeng Duan**, & Zhenguang Cai (2023). Does ChatGPT Resemble Humans in Processing Implicatures? *Proceedings of the 4th Natural Logic Meets Machine Learning Workshop*, Nancy, France.

Xufeng Duan (2018). Language rehabilitation training therapies for Chinese aphasia — Using Chinese characters as clues. *Beyond A Limited Scope: Chinese for Specific, Academic, & Professional Purposes*, Hawaii, US.

Xufeng Duan (2018). The Dependence on different symbolic systems during word recognition-pronunciation tests by Chinese native speakers with aphasia — based on eye-movement methodology. *Annual Conference of the Chinese Society of Neurological Linguistics*, Xuzhou, China.

Xufeng Duan (2018). The Rules of Prominency and Locality Psychological Reality Basis. *Annual Academic Conference of the Chinese Linguistic Society*, Guangzhou, China.

Poster Presentation

Zhang, Y., **Duan, X.**, & Cai, Z. (2024). The causal role of left inferior frontal gyri in Chinese character handwriting: A transcranial magnetic stimulation study. *The annual meeting of Society for the Neurobiology of Language (SNL)*, Brisbane, Australia.

Qiu, Z., **Duan, X.**, & Cai, Z. (2024). Do Large Language Models Resemble Humans in Grammaticality Judgement? *Human sentence processing 2024*, University of Michigan, USA.

Duan, X., Cai, Z., & Yao, B. (2023). Electrophysiological responses associated with character amnesia in Chinese handwriting. *Architectures and Mechanisms for Language Processing (AMLaP)*, Donostia-San Sebastián, Spain.

Wu, H., **Duan, X.**, & Cai, Z. (2023). Belief of Speakers' Linguistic Competence Modulates the N400 Effect Elicited by Inconsistent Lexical Use. *Architectures and Mechanisms for Language Processing (AMLaP)*, Donostia-San Sebastián, Spain.

Qiu, Z., **Duan, X.**, Cai, Z., & Zhao, N. (2023). Pragmatic Implicature Processing in ChatGPT. *Architectures and Mechanisms for Language Processing (AMLaP)*, Donostia-San Sebastián, Spain.

Training and Internship

- **TMS Training** May 2023
  APAC TMS clinic Workshop, University of Numnich & MagMore Company.

- **Language Therapist** Jul. 2017 – Jul. 2019
  The Third Affiliated Hospital of Sun Yat-sen University.

Skill

- **LLMs**: Mechanistic interpretability, Model fine-tuning, Benchmark Construction, etc.

- **Experimentation:** fMRI / TMS / EEG / fNIRS / Eye-tracker using PsychoPy & Experiment Builder & E-prime & Gorilla / Qualtrics.

- **Coding:** Python, R and Matlab.

Last updated: 21/08/2025