



Department of Psychology  
The University of Hong Kong  
香港大學心理學系

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# Departmental Seminar

## Recursive Mentalization in Mind and Machine



**Prof. Lei Zhang**

Associate Professor  
School of Psychology  
University of Birmingham

**3:00p.m. – 4:00p.m.**

Room 715, 7/F  
The Jockey Club Tower  
Centennial Campus  
The University of Hong Kong

### Abstract

Large language models (LLMs) have robustly demonstrated behavioural patterns representative of high-order cognitive processes similar to humans. Yet, whether this extends to mentalization – the explicit modeling and inference of another’s intention and action – particularly during social interaction remains largely unexplored. Using two economic tasks testing strategic interaction, we demonstrate explicit signatures of mentalization across LLMs and human participants. Notably, implementing a simple prompting scheme robustly improved model performance in the inspection game by inducing recursive reasoning. In the rock-paper-scissors game, models differed significantly in their ability to adaptively mentalize towards opponents. Collectively, we present novel evidence towards mentalization among LLMs and highlight computational modeling as a method for understanding minds and machines.

### About the Speaker

Dr. Lei Zhang is an Associate Professor at the Centre for Human Brain Health, School of Psychology, University of Birmingham, UK. He directs the Adaptive Learning Psychology & Neuroscience (ALPN) Lab, where he addresses the fundamental question of the “adaptive brain” by studying the cognitive, computational, and neurobiological basis of social learning and decision-making in healthy individuals and in psychiatric disorders, and recently in AI and large language models. Dr. Zhang received multiple international prizes and recognitions, including the Rising Star Award from the Association for Psychological Science and the Credibility Prizes from the British Neuroscience Association. He is an Editorial Board Member for Communications Biology and PLOS Mental Health, and has served as a reviewing expert for multiple journals and international research funding agencies (e.g., ERC, NIH).

### Zoom Meeting (For participants who couldn’t attend the Seminar in person)

<https://hku.zoom.us/j/92366933079?pwd=bv0TJ9sM6x0b4whACac4atLqFdejIb.1>

Meeting ID: 923 6693 3079 | Password: 555921

~ All are Welcome ~

Enquiry: [ywyao@hku.hk](mailto:ywyao@hku.hk)

