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## EDUCATION

- Peking University (PKU)** 09/2020-07/2026  
Academy for Advanced Interdisciplinary Studies  
Ph.D. candidate (Weiming Scholar) in Integrative Life Sciences, supervised by Prof. Fang Fang
- Peking University (PKU)** 09/2016-07/2020  
School of Psychological and Cognitive Sciences  
B.S. (Honored Graduate) in Psychology, supervised by Prof. Fang Fang
- University of California, Los Angeles (UCLA)** 07/2019-09/2019  
Cross-disciplinary Scholars in Science and Technology Program, supervised by Prof. Ladan Shams

## RESEARCH HIGHLIGHTS/研究亮点

- ◆ **Keywords: vision, perceptual learning, plasticity, cognition enhancement, consolidation, attention**
- ◆ Anodal tDCS over visual cortex enhances offline consolidation of visual perceptual learning — revealing a rare causal leverage over unconscious learning processes. ([tDCS](#), [psychophysics](#))
- ◆ Photic modulation of offline visual learning via frequency-tuned stimulation linked to LTP-like plasticity. ([fMRI](#), [sMRI \(VBM\)](#), [MRS](#), [EEG](#), [computational modeling \(RSNN\)](#))
- ◆ The right superior parietal lobule as a causal hub translating objective load into subjective effort in visual tracking. ([fMRI \(FIR, DCM, multilevel mediation\)](#), [HD-tDCS](#), [electrical field simulation](#), [pupillometry](#))
- ◆ Transcranial alpha entrainment as a powerful frequency-specific approach to sculpt the time course of visual learning. ([tACS](#), [MEG](#), [electrical field simulation](#))

## RESEARCH INTEREST

How deceptively simple interventions like visual stimulation modulate neural circuit function and structure; leveraging a broad repertoire of neuroimaging, electrophysiological, stimulation, behavioral, and computational tools to uncover underlying mechanisms and inform brain–computer interfaces and the targeted design of stimuli to enhance cognition.

## SKILLS/技能

- ◆ **Experimental Techniques:**
  - Neuroimaging: **fMRI, sMRI, MRS;**
  - Electrophysiology: **EEG, MEG;**
  - Brain stimulation and modeling: **tES, HD-tES, electrical field simulation;**
  - Computational modeling;**
  - Psychophysics and Pupillometry;
- ◆ **Coding: MATLAB, Python, R, C/C++, Bash.**
- ◆ **Software: SPM, Freesurfer, BrainNetViewer, SPSS, SimNibs, etc.**
- ◆ **Computational Approaches: MVPA, RSA, DCM, PPI, Neural Network Modeling.**
- ◆ **Additional: English (TOEFL 118), French (b1), Scientific illustration and figure design: proficient in digital drawing, created illustrations and schematic figures for multiple published articles.**

## PUBLICATIONS

**Yang, X.-Y.**, Zhao, C., Zuo, Z., Li, A., Luo, H.\*, He, Q.\*, & Fang, F\*. Frequency-dependent photic modulation of wakeful consolidation in visual learning. *Nature Communications*. (Accepted).

**Yang, X.-Y.**, He, Q. & Fang, F\*. Transcranial direct current stimulation over the visual cortex facilitates awake consolidation of visual perceptual learning. *Brain Stimulation* 15, 380-382 (2022).

Liu, C. \*, **Yang, X.-Y.** & Xu, X. Brain state model: A novel method to represent the rhythmicity of object-specific selective attention from magnetoencephalography data. *Neurocomputing* 634, 129920 (2025).

He, Q., **Yang, X.-Y.**, Gong, B., Bi, K. & Fang, F\*. Boosting visual perceptual learning by transcranial alternating current stimulation over the visual cortex at alpha frequency. *Brain Stimulation* 15, 546-553 (2022).

He, Q., **Yang, X.-Y.**, Zhao, D. & Fang, F\*. Enhancement of visual perception by combining transcranial electrical stimulation and visual perceptual training. *Medical Review* 2, 271-284, (2022).

### **In preparation:**

Bi, K. #, **Yang, X.-Y.** #, Liu, C., Chen L., Fang, F.\* Causal role of the right superior parietal lobule in mental effort and visual attention performance.

He, Q. #, **Yang, X.-Y.** #, Zhu, X. #, Fang, F.\* The effect of tDCS on wakeful consolidation is mediated by the sleep-wake cycle.

Bi, K. #, **Yang, X.-Y.** #, Chen, L., Fang, F.\* A comprehensive investigation on HD-tES' effect on visual search in static scenes and underlying mechanisms.

(# Equal contribution)

### **CONFERENCE/学术会议报告**

- ◆ Annual Meeting of the Society for Neuroscience (**SfN 2025**). “Causal contribution of the right superior parietal lobule to mental effort in shaping multiple object tracking performance.”
- ◆ Annual Meeting of the Vision Science Society (**VSS 2025**). “Hebbian plasticity in a recurrent network model explains enhanced wakeful consolidation via repetitive sensory stimulation.”
- ◆ Annual Meeting of the Organization of Human Brain Mapping (**OHBM 2024**). “10-Hz Flicker Boosts Early Consolidation of Visual Perceptual Learning via Augmented Glx/GABA Ratio.”
- ◆ Annual Meeting of the Vision Science Society (**VSS 2024**). “LTP-like activity induced by post-training rhythmic flicker consolidates visual perceptual learning.”
- ◆ Annual Meeting of the Vision Science Society (**VSS 2021**). “The role of anodal transcranial direct current stimulation (tDCS) in the consolidation of visual perceptual learning is mediated by the wake/sleep cycle.”

### **ACADEMIC SERVICES/学术服务**

#### ◆ Peer Review

Co-Reviewer (with Prof. Fang Fang): Nature Human Behaviour, Nature Communications, Current Biology, Cerebral Cortex, Eneuro, Medical Review

#### ◆ Teaching Experience

Teaching Assistant: [General Psychology] [Sensation and Perception] [Frontiers in Psychological Science]  
Peking University, 2021-2025

### **HONORS**

Merit Student, PKU	2024
China Industrial Bank Scholarship	2024
Merit Student, PKU	2023
<b>The Presidential Scholarship, Peking University (considered the highest honor awarded by PKU to Ph.D. students)</b>	2023
Grad Student Presentation Award of the Annual Conference of the Psychological Committee of China	2022
<b>Weiming Scholar</b>	2020
<b>Honored Graduate, PKU</b>	2020

Departmental Scholarship, School of Psychological and Cognitive Sciences, PKU	2020
Merit Student, PKU	2019
University Scholarship, PKU	2019
Education Abroad Program Scholarship, PKU	2019
<b>Scientific Research Excellence Award, PKU</b>	2018
<b>May 4<sup>th</sup> Scholarship, PKU</b>	2018