Jun-Yu Pan

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Education

Shanghai Jiao Tong University September 2026 – March 2029 (Expected)
M.Eng. in Electronic Information, SJTU Paris Elite Institute of Technology *Shanghai, China*
- Advisor: Prof. Wei-Long Zheng
- Research interests: EEG foundation models, multimodal large language models (MLLMs), and applications of EEG foundation models

Shanghai Jiao Tong University September 2022 – June 2026
Bachelor of Engineering, SJTU Paris Elite Institute of Technology *Shanghai, China*
- Weighted Average: 87.12/100 | GPA: 3.66/4.3 | Rank: 7/19
- Honors: Outstanding Bachelor's Thesis of Shanghai Jiao Tong University (Top 1%); Third-Class Scholarship (Top 15%); Academic Progress Scholarship
- Second Prize, "Shan Shu" Mathematical Contest in Modeling; Shanghai Third Prize, Contemporary Undergraduate Mathematical Contest in Modeling

Research Experience

Microsoft Research Asia (MSRA) April 2025 – Present
Research Intern, Shanghai AI/ML Group | Top 5% Intern | Advisor: Yansen Wang *Shanghai, China*
- Brain Project (Star Project): EEG foundation models and EEG-MLLM alignment, spanning large-scale pretraining, model scaling, predictive learning, data selection, multi-dataset fine-tuning, and visual grounding.
- Completed five manuscripts: four ICLR 2027 submissions (three as first author) and one co-first-author CHI 2027 submission; the generative visual grounding work is also available on arXiv.

BCMI, Shanghai Jiao Tong University June 2023 – June 2026
Research Assistant | Advisor: Prof. Wei-Long Zheng *Shanghai, China*
- Studied EEG-based affective computing, with an emphasis on cross-scenario, contrastive, and multimodal emotion recognition.
- Developed DDCT for video-to-game emotion recognition and M4Lego for multimodal gameplay emotion recognition using EEG and eye movements.

Selected Research Projects

Large-Scale Pretraining and Model Scaling for EEG Foundation Models *MSRA Brain Project (Star Project)*
- Investigated how pretraining-data volume and model capacity affect transfer across EEG tasks.
- Independently handled data curation, quality control, pretraining, and evaluation; expanded the corpus to 515 sources and approximately 80,000 hours of windowed EEG, with model variants spanning 5.8M–1.97B encoder parameters.
- Across 23 downstream tasks, the developed models currently rank first by a substantial margin among all EEG foundation models.

Multi-Scale State-Dynamics Pretraining for EEG Transfer *MSRA Brain Project (Star Project)*
- Developed MSDE to learn EEG dynamics beyond masked content recovery, jointly predicting micro- and macro-scale future teacher states with a causal encoder and an elapsed-time-conditioned transition operator.
- MSDE-Full and MSDE-10% ranked first and second on average across 20 OmniEEG-Bench tasks among eight models; MSDE-10% uses a 5.0M-parameter encoder and 2,115 hours of EEG.

Think It Your Way: Toward Strategy-Open Brain–Computer Interaction *MSRA Brain Project (Star Project)*
- Introduced strategy-open BCI, which specifies the task goal while allowing users to form and revise their own mental strategies instead of following a prescribed interaction mapping.
- Conducted an offline study with 26 participants in a continuous three-lane parkour task using EEG and self-reports; strategies were heterogeneous and revised mainly early, while movement direction and target lane remained decodable across visual themes.

Generative Visual Grounding for Universal EEG Understanding *MSRA Brain Project (Star Project)*

- Proposed GVG to improve EEG understanding and generation in MLLMs, using EEG-to-image proxy generation, native visual-token prediction, and EEG-image-text alignment to reuse pretrained visual priors.
- GVG-Janus improved mean balanced accuracy across six tasks from 45.89% (text-only) to 53.46% (image-only); trimodal alignment with full adaptation reached 60.05%.

Architecture-Dependent Data Selection for EEG Foundation Models *MSRA Brain Project (Star Project)*

- Audited 202 pretraining configurations across LaBraM, CBraMod, and BIOT, covering 16 candidate datasets and 13 downstream tasks; compared Progressive, PDV, Size, and Coverage data rankings.
- Found 121 configurations that outperformed full-pool pretraining with fewer windows; the best subsets gained up to 5.58 mean balanced-accuracy points, revealing architecture-dependent source utility.

Probe-Guided Multi-Dataset Fine-Tuning for EEG Foundation Models *MSRA Brain Project (Star Project)*

- Developed POSE to reduce multi-dataset interference, selecting and weighting auxiliary sources using MMD and Fréchet-distance levels and trends during target adaptation, followed by phased auxiliary participation.
- Evaluated on 12 datasets; mean balanced accuracy over 11 classification tasks rose from 54.5% to 56.0% on LaBraM and 52.8% to 55.0% on CBraMod versus target-only fine-tuning.

Cross-Scenario and Multimodal Emotion Recognition *BCMI, SJTU*

- Proposed Double Domain Converter Transformer (DDCT) for EEG emotion recognition across video and gameplay scenarios; the work was published at ICASSP 2025.
- Developed M4Lego, a multimodal pretraining framework that integrates EEG and eye movements using multi-level masking and Lego-style blocks for emotion recognition during gameplay.

Publications

[1] **Jun-Yu Pan**, Ruicheng Yin, Yansen Wang, Bao-Liang Lu, Dongsheng Li, and Wei-Long Zheng. "From Static Descriptions to State Dynamics: Multi-Scale Pretraining for EEG Transfer." *International Conference on Learning Representations (ICLR 2027)*, under review.

[2] Xin Xu*, **Jun-Yu Pan***, Ruicheng Yin, Zilong Wang, Dongqi Han, Dongsheng Li, Bao-Liang Lu, Wei-Long Zheng, and Yansen Wang. "Think It Your Way: Toward Strategy-Open Brain–Computer Interaction." *ACM CHI Conference on Human Factors in Computing Systems (CHI 2027)*, under review.

[3] **Jun-Yu Pan**, Enze Zhang, Bao-Liang Lu, Wei-Long Zheng, Dongsheng Li, and Yansen Wang. "Visualizing the Invisible: Generative Visual Grounding Empowers Universal EEG Understanding in MLLMs." *International Conference on Learning Representations (ICLR 2027)*, under review. arXiv:2605.18172.

[4] **Jun-Yu Pan**, Ruicheng Yin, Bao-Liang Lu, Wei-Long Zheng, Dongsheng Li, and Yansen Wang. "Which Data, Not How Much: Architecture-Dependent Data Selection for EEG Foundation Models." *International Conference on Learning Representations (ICLR 2027)*, under review.

[5] Ruicheng Yin, **Jun-Yu Pan**, Yansen Wang, Xiaoqing Zheng, and Dongsheng Li. "Discern, Then Combine: Probe-Guided Multi-Dataset Fine-Tuning for EEG Foundation Models." *International Conference on Learning Representations (ICLR 2027)*, under review.

[6] **Jun-Yu Pan***, Jing-Yi Liu*, Bao-Liang Lu, and Wei-Long Zheng. "M4Lego: A Multi-Modal Pretraining Framework with Multi-Level Masking and Lego Blocks for Emotion Recognition During Gameplay." *IEEE Transactions on Affective Computing*, under review.

[7] **Jun-Yu Pan**, Hao-Long Yin, and Wei-Long Zheng. "Double Domain Converter Transformer for Improving EEG-Based Emotion Recognition from Video to Game Scenarios." *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2025.

*Equal contribution.

Technical Skills

Programming: Python, C **Frameworks:** PyTorch **Languages:** Mandarin, English, French