Hua (Edward) XU

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Research direction: Emotion and self-understanding through probabilistic models and neural dynamics.

EDUCATION

The Hong Kong University of Science and Technology (Guangzhou) Sep. 2023–Present
BSc in Data Science and Big Data Technology (expected Jul. 2027) Guangzhou, China
- GPA: **3.864/4.300**; Dean's List for four semesters.

University of California, Los Angeles Sep. 2025–Jan. 2026
Study Abroad Program, UCLA Extension Los Angeles, USA
- GPA: **4.000/4.000**.

PUBLICATIONS AND SELECTED ACADEMIC CONTRIBUTIONS

**Equal contribution, †Corresponding author.*

[1] **Hua (Edward) XU***, Dongxin Li*, Gwen Yidou-Weng, Guy Van den Broeck, Wei Wang, Anji Liu. "Grab a Coffee: Future-Aware Guidance for Discrete Diffusion with Compiled Objectives". *Submitted to ICLR'27; arXiv preprint*.

[2] Yang Yang*, **Hua XU***, Zhangyi Hu*, Yutao Yue†. "RLIE: Rule Generation with Logistic Regression, Iterative Refinement, and Evaluation for Large Language Models". *ICML'26*.

[3] **Hua XU**. "Building Interpretable, Trust-worthy Systems for Neural Signal Decoding". *AAAI'26 Undergraduate Consortium*.

[4] Maijunxian Wang, Ruisi Wang, Juyi Lin, . . . , **Hua XU**, . . . , Hokin Deng†. "A Very Big Video Reasoning Suite". *ICML'26*.

[5] Zhangyi Hu*, Jiemin Wu*, **Hua XU***, Mingqian Liao, Ninghui Feng, Bo Gao, Songning Lai, Yutao Yue†. "IMTS is Worth Time × Channel Patches: Visual Masked Autoencoders for Irregular Multivariate Time Series Prediction". *ICML'25*.

[6] Yuchao ZHUO, **Hua XU**, et al. "vNeck: Electrical Muscle Stimulation Around the Neck for Eyes-Free Target Acquisition in Virtual Reality". **Best Paper**, *ICHEC'25*.

SELECTED RESEARCH EXPERIENCES

COMPUTATIONAL AND BIOLOGICAL RESEARCH

COFFEE: Tractable Guidance for Discrete Diffusion *Discrete Diffusion, Graphical Models* Nov. 2025–Present
UCLA-origin collaboration (continued remotely), Supervisors: Prof. Anji Liu (NUS); Prof. Wei WANG (HKUST(GZ)) Los Angeles / remote
- To guide discrete diffusion over exponentially many completions, I formulated and implemented structured inference combining token-dependency models with compiled finite-state objectives.
- As project lead, I designed language, DNA and protein evaluations. On 1,497 held-out CommonGen inputs at 32 steps per chunk, lexical coverage rose from 40.9% for the frozen base model to 100%, with GPT-2-large evaluator perplexity 14.4 versus 20.3.

Brain Alignment Across Diffusion Language Model States *Model–Brain Alignment* Jul. 2026–Present
HKUST(GZ), Supervisor: Prof. Wei Wang Guangzhou, China
- I built a passage-grouped evaluation pipeline testing whether partially corrupted LLaDA states add prediction of language-selective fMRI beyond clean representations and matched controls. Corrupted states did not improve held-out prediction in the tested comparisons.
- Open-source output: LLaDA-8B model plugin and submission-workflow fix merged into Brain-Score Language.

Neural Cell State Analysis Using MEA and ODT *AI for Neuroscience* Jul. 2026–Present
HKUST(GZ), Supervisors: Prof. Julie Qiaojin Lin; Prof. Wei Wang Guangzhou, China
- I analyze longitudinal MEA spikes from cultured networks on one plate, holding out recording sessions within physical wells. A continuous model beat a context-mean baseline in 17/18 wells, while overpredicting bursting and active-site fractions.
- For 200 paired 3D ODT and fluorescence volumes, I built registration, QC, and representation-learning pipelines; acquisition confounds and missing cell-state labels limit interpretation. I also mentor a junior undergraduate on MEA.

Replay and Preplay in Symbolic Reasoning *In-Context Learning, Mechanistic Analysis* Sep. 2026–Present
Undergraduate Thesis, Supervisors: Wei Wang; Kefei Liu Guangzhou, China
- I use controlled symbolic tasks and activation-based analyses to test how small Transformers retrieve and reuse previously observed relations.
- Matched decoding and interventions found order-related information and recombinable intermediate content; fixed-position retrieval remains a competing explanation.

Utilising Chromoprotein Expression to Counteract Coral Bleaching *Synthetic Biology* Feb. 2024–Oct. 2024
Team Leader & Wet Lab Leader, Supervisor: Prof. Julie Qiaojin LIN Guangzhou, China
- As team leader and wet lab lead, I designed a light- and heat-responsive chromoprotein circuit and led its characterization, organizing 15 undergraduates with guidance from 10 PhD advisers and raising USD 42K.
- The team observed an approximately sixfold light-sensor switch ratio; apparent photoprotection in algal co-culture was not statistically significant. The team received an iGEM Gold Medal and a Best New Basic Part nomination.

ADDITIONAL RESEARCH EXPERIENCES

Large Language Model-Based Rule Generation with Logistic Regression *Neural-Symbolic AI* Mar. 2025–May 2026
HKUST(GZ), Supervisor: Prof. Yutao YUE Guangzhou, China
- I contributed evaluation design, data analysis and manuscript writing to the ICML'26 paper RLIE on weighted LLM-generated rules.

Irregular Multivariate Time Series Prediction Using Vision Foundation Model *Time Series* Dec. 2024–May 2025
HKUST(GZ), Supervisor: Prof. Yutao YUE Guangzhou, China
- The method adapts a visual masked autoencoder to time × channel patches of asynchronous observations.
- I designed and ran experiments and contributed to the manuscript and rebuttal for the ICML'25 paper.

vNeck: Human Studies of an Electrical-Stimulation Interface
User-study work and data processing; ICHEC 2025 paper, proceedings published 2026 Guangzhou, China
- I contributed user-study work and data processing to a project testing orientation, distance perception and target acquisition, including individual differences in stimulation sensitivity.

SELECTED PROJECT EXPERIENCES

AI4Education: Gesture-to-Protocol Lab Training *AI for Education, Entrepreneurship* Jul. 2026–Present
Technical Development & Commercialization, Pre-Pilot Venture Guangzhou, China
- Developing AI-assisted laboratory guidance, aiming to broaden access to hands-on instruction where teacher time is limited.
- Built a posterior-smoothed MediaPipe-to-DFA tracker for controlled demos and defined pipetting guidance with teacher escalation; real-lab and educational validation remain pending.

LEADERSHIP AND PUBLIC SERVICE

Survey Interviewer, Guangzhou Metropolitan Panel Survey (GPS) 2023–2024
HKUST(GZ)
- Conducted in-person household interviews across Guangzhou, including urban-village communities, to document residents' socioeconomic and living conditions.

Major Mentor, 2025 and 2026 iGEM Teams Nov. 2024–Present
HKUST(GZ)
- Mentor both cohorts in wet-lab training, project supervision, scientific writing, and presentations. The 2025 team received an iGEM Gold Medal; mentoring for the 2026 team is ongoing.

Student Representation and University Governance Jul. 2024–Present
HKUST(GZ)
- Senate member (Jul. 2024–Jul. 2025); Teaching and Learning Quality Committee member (Jul. 2025–Present), representing undergraduates in university deliberations.
- Student Union presidium (Apr. 2025–May 2026): helped establish its inaugural operating structures and procedures.
- DSA Student–Staff Liaison Committee representative (2026–Present), contributing to a consultative forum for programme feedback.

SELECTED ACHIEVEMENTS

Lizhi Scholarship Jun. 2026
The Information Hub of HKUST(GZ)

Research Excellence Award Jan. 2026
The Data Science and Analytics Thrust of HKUST(GZ)

National Scholarship, 2023–2024 Academic Year 2024
Ministry of Education of the People's Republic of China

iGEM Gold Medal Oct. 2024
International Genetically Engineered Machine Competition (iGEM)
- Team nomination for Best New Basic Part, Undergrad; student leader of HKUST-GZ.