Ji-An Li

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Education

University of California, San Diego	California, USA
Doctoral Study in Neurosciences	2020 – Present
M.S. in Neurosciences	2020 – 2024
Advisor: Marcus Benna, Marcelo Mattar	GPA: 4.0/4.0
University of Science and Technology of China	Anhui, China
M.S. in Applied Statistics	2016 – 2019
Advisor: Xiaochu Zhang, Yaning Yang	GPA: 4.1/4.3
B.S. in Biological Science	2012 – 2016
Advisor: Xiaochu Zhang	GPA: 4.0/4.3
Shitsan Pai Talent Program in Life Sciences (Honor)	
B.E. in Computer Science and Technology (Dual)	2012 - 2016
Advisor: Shangfei Wang	GPA: 4.0/4.3

Research experience

Student researcher, Department of Neurosciences, UC San Diego	
Advisor: Marcus Benna, Marcelo Mattar	2020 – Present
Student researcher, School of Life Sciences, USTC	
Advisor: Xiaochu Zhang	2015 – 2020
Student researcher, Zuckerman Institute, Columbia University	
Advisor: Stefano Fusi	2018 – 2020
Student researcher, Center for Neural Science, New York University	
Advisor: Xiao-Jing Wang	2017

Industry experience

Research Scientist Intern, EMG Foundation Team, Reality Lab, Meta — 2025

Grant

Innovative Research Grants Award (Kavli Institute, UCSD) — 2023

Honors

GPSA Fall Travel Grant Award (UCSD)	2024
Outstanding Achievement Award in Scientific Research for Higher Education Institutions, Third Prize (Ministry of Education)	2024
Interpretability Hackathon 3.0, First Place	2023
Outstanding Research Paper Award (USTC)	2020
Graduate Scholarship, Grade 1 (USTC)	2018
Suzhou Industrial Park Scholarship (USTC)	2017
Outstanding Undergraduate Thesis (USTC)	2016
Guo Moruo Scholarship (USTC, Highest Honor)	2015
National Scholarship (Chinese Ministry of Education)	2014
Outstanding Student Scholarship, Gold Medal (USTC)	2013
Outstanding Freshman Scholarship (USTC)	2012
China High School Biology Olympiad, Nationwide, Silver Medal	2011
China High School Biology Olympiad, Anhui Province, First Prize	2011
National Olympiad in Informatics, Anhui Province, First Prize	2010

Publications

L Ji-An, MK Benna, MG Mattar. Discovering Cognitive Strategies with Tiny Recurrent Neural Networks. ***Nature***. 2025

M Binz, E Akata, … L Ji-An, … Eric Schulz. A foundation model to predict and capture human cognition. ***Nature***. 2025

L Ji-An*, C Zhou*, MK Benna†, MG Mattar†. Linking In-context Learning in Transformers to Human Episodic Memory. *NeurIPS.* 2024

L Zhang, JA Li, ..., MK Benna, J Shi. Emulating Complex Synapses Using Interlinked Proton Conductors. *Physical Review Applied.* 2024

L Ji-An, F Stefanini, MK Benna, S Fusi. Face familiarity detection with complex synapses. *iScience.* 2023

JA Li, D Dong, Z Wei, Y Liu, Y Pan, F Nori, X Zhang. Quantum Reinforcement Learning during Human Decision Making. ***Nature Human Behaviour.*** 2020

Y Cheng, ..., JA Li, ..., X Zhang. Dysfunctional resting-state EEG microstate correlated with the severity of cigarette exposure in nicotine addiction. *Science China Information Sciences.* 2020

R Zha, ..., JA Li, ..., X Zhang. Transforming brain signals related to value evaluation and self-control into behavioral choices. *Human brain mapping.* 2019

* = equal contributions

Preprints

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. DynamicRL: Data-Driven Estimation of Trial-by-Trial Reinforcement Learning Parameters. *PsyArXiv.* 2025

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Humans Learn to Weight Evidence Unevenly Over Time. *PsyArXiv.* 2025

L Ji-An*, HD Xiong*, ..., MK Benna. Language Models Are Capable of Metacognitive Monitoring and Control of Their Internal Activations. *arXiv.* 2025

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Deep Learning Improves Parameter Estimation in Reinforcement Learning Models. *bioRxiv.* 2025

L Ji-An, MK Benna. Deep Learning without Weight Symmetry. *arXiv.* 2024

M Molano-Mazón, J Barbosa, ... L Ji-An, ... GR Yang. NeuroGym: An open resource for developing and sharing neuroscience tasks. *PsyArXiv, aqc9n.* 2022

S Minni*, L Ji-An*, T Moskovitz, G Lindsay, K Miller, M Dipoppa, GR Yang. Understanding the Functional and Structural Differences across Excitatory and Inhibitory Neurons. *bioRxiv.* 2019

* = equal contributions

Conference submissions

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. DynamicRL: Extending Reinforcement Learning Models to Capture Trial-by-Trial Parameter Changes. **Talk**. *CogSci 2025*

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Human Adaptation of Learning Strategies Resembles Policy Gradients. Poster. *CogSci 2025*

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Gradient-Based Online Learning Explains Evidence Accumulation across Multiple Timescales. Poster. *CogSci 2025*

L Ji-An, MK Benna. Biologically plausible credit assignment via neuronal frequency multiplexing. Poster. *Cosyne 2025*

J Zida*, L Ji-An*, MG Mattar. Understanding atypical decision making behavior with recurrent neural networks. **Contributed Talk**. *Cosyne 2024*

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Distilling decision-making dynamics with low-dimensional architectures. Poster. *Cosyne 2024*

L Ji-An, MK Benna. Biologically plausible credit assignment without weight symmetry. Poster. *Cosyne 2024*

HD Xiong*, L Ji-An*, MG Mattar, RC Wilson. Distilling human decision-making dynamics: a comparative analysis of low-dimensional architectures. Poster. *NeurIPS Workshop AI4Science 2023*

HD Xiong*, L Ji-An*, MG Mattar, R Wilson. Neural network modeling reveals diverse human exploration behaviors via state space analysis. **Contributed talk**. *Cognitive Computational Neuroscience 2023*

L Ji-An, MG Mattar. What do meta-reinforcement learning networks learn in two-stage decision-making? Poster. *Cosyne 2022*

GR Yang, J Pastor-Ciurana, M Fradera, RY Zhang, J Forest, J Pozo, J Barbosa, L Ji-An, CJ Cueva, A Compte, J Rocha, M Molano-Mazon. Neurogym: An open resource to developing and sharing neuroscience tasks. Poster. *Cosyne 2021*

S Minni*, L Ji-An*, T Moskovitz, G Lindsay, K Miller, M Dipoppa, GR Yang. Understanding the functional and structural differences across excitatory and inhibitory neurons. Poster. *Cosyne 2020*

JA Li, F Stefanini, MK Benna, S Fusi. A Face Familiarity Detection System with Complex Synapses. Poster. *Cosyne 2019*

JA Li, Z Wei, X Zhang. Behavioral and neural evidence for quantum reinforcement learning during decision making. Poster. *Society for Neuroscience 2018*

JA Li, GR Yang, XJ Wang. Neural Mechanisms of Recurrent Neural Networks with Interneurons and Dendrites Performing Context-dependent Decision Making. Poster. *Society for Neuroscience 2018*

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Talks

Computational Machinery of Cognition, TU Dresden	2024
Contributed talk, Cosyne	2024
AI for Brain Science, Tianqiao and Chrissy Chen Institute	2023
Neurodinner, Neurosciences Graduate Program, UCSD	2023
KIBM Symposium on Innovative Research, UCSD	2023
Computational Psychiatry Seminar, Chinese Computational Psychiatry Network	2021
Brain Science Institute, RIKEN, Japan	2018

Reviewer

eLife, Science Advances, IEEE/CAA Journal of Automatica Sinica, IEEE Transactions on Cybernetics, IEEE Transactions on Cognitive and Developmental Systems, Imaging Neuroscience, Open Mind, Frontiers in Human Neuroscience, Scientific Reports, Frontiers in Psychiatry, BMC Neuroscience, Behavior Research Methods, International Conference on Learning Representations (ICLR), Conference on Neural Information Processing Systems (NeurIPS), Conference on Cognitive Computational Neuroscience (CCN)

Editorial board

Associate editor (Frontiers in Psychiatry, Neuroimaging)
Review editor (Frontiers in Psychiatry, Addictive Disorders)

Leadership

Co-founder, Naodao (Brain Island) platform	2024 – Present
Organizer, Neurotheory Journal Club, UCSD	2024 – Present
Chair, Computational Neuroscience Committee, UCSD	2023 – Present
Vice President, Nature Protection Association, USTC	2015 – 2016

Teaching

Instructor, NEU 200C Cognitive Neuroscience, UCSD	2023
Teaching assistant, Regression Analysis, USTC	2018
Excellent Teaching Assistant Honor	

Academic activities

Student, Analytical Connectionism Summer School	2024
Volunteer, Neuromatch Academy	2022-2023
Student, Computational & Cognitive Neuroscience Summer School, CSHA	2021
Student, Neuromatch Academy	2020
Translator, *A Concise Handbook of TensorFlow*, supported by Google Developer Relations Team	2018
Student, Japanese and Asian Youth Science Exchange Project	2015
Intern student, Institute of Biophysics (Beijing), CAS	2013

Programming

Python, TensorFlow, PyTorch, MATLAB, R, C++, Bash, SQL, AFNI