

# Jiachuan Wang

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## SUMMARY:

My research interests are in computational and cognitive neuroscience, especially in understanding how the brain supports memory and decision-making. I am currently pursuing a Ph.D. at the National University of Singapore, where I develop biologically plausible models of spatial learning and associative memory. Previously, I worked on fMRI research examining human cognition and contributed to studies of the primate connectome.

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## EDUCATION:

<b>National University of Singapore</b> <i>Ph.D. student in Medicine</i> <i>Neuroscience track and Biostatistics, Bioinformatics &amp; Epidemiology track</i>	Singapore Aug. 2023 – Present
<b>Zhejiang University</b> <i>B.S. in Bioinformatics</i>	Hangzhou, China Sep. 2019 – Jun. 2023
<b>The University of Edinburgh</b> <i>B.S. (Hons) in Biomedical Informatics</i>	Edinburgh, UK Sep. 2019 – May. 2023

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## GRANTS & AWARDS:

<b>NUS Research Scholarship</b> <i>NUS Graduate School</i>	Aug. 2023 – Aug. 2027
<b>Outstanding Graduate of Zhejiang University</b>	May. 2023
<b>Zhejiang University Scholarship</b> <i>Zhejiang University</i>	Dec. 2022
<b>Academic Scholarship (¥40,000)</b> <i>ZJU-UoE Institute</i>	Dec. 2022
<b>2021 Student Research Training Program Funding (¥1,200)</b> <i>Zhejiang University</i>	Mar. 2021 – May. 2022

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## RESEARCH EXPERIENCE:

<b>The N.1 Institute for Health, National University of Singapore</b> <i>Graduate Researcher;</i> <i>Advisors: Andrew Tan, Camilo Libedinsky, Shih-Cheng Yen</i> <i>Computational models of biologically plausible synaptic plasticity in neural networks</i> <ul style="list-style-type: none"><li>• Implemented reinforcement learning models using spike response model and STDP rule to solve spatial navigation tasks.</li><li>• Developed a representation learning model incorporating Hebbian plasticity and neurogenesis in the hippocampal circuit, replicating pattern separation.</li></ul>	Singapore Sep. 2023 – Present
<b>Centre for Discovery Brain Sciences, The University of Edinburgh</b> <i>Research Intern; Advisor: Gediminas Lukšys</i>	Edinburgh, UK Mar. 2022 – Aug. 2023

*Multi-voxel pattern analysis of human emotion and memory guided by Neurosynth (final year project)*

- Conducted brain mapping of emotional dimensions and memory retrieval performance in a picture task.
- Compared the decoding performance of machine learning models using brain region information from real fMRI data and a meta-analysis database.

*Computational model-based analysis of spatial navigation strategies under stress and uncertainty using place and border cells*

- Conducted behavioral analysis in Morris Water Maze experiments.
- Performed parameter estimation for spatial navigation reinforcement learning models.

**School of Brain Science and Brain Medicine, Zhejiang University**

Hangzhou, China

Research Intern; Advisor: Zhiping Wang

Jan. 2022 – Sep. 2022

Jun. 2020 – Aug. 2020

*The role of protein quality control regulator UBE4B on the neurodevelopment of mammalian hippocampus*

- Analyzed label-free quantification data and performed enrichment analysis. One publication.

**Interdisciplinary Institute of Neuroscience and Technology, Zhejiang University**

Hangzhou, China

Research Intern; Advisor: Anna Wang Roe

Apr. 2021 – Oct. 2021

*Visualization software development of functional magnetic resonance data analysis results*

- Developed a web-based fMRI data visualization tool with automated labeling function.
- Assisted in animal preparations and recorded five infrared neural stimulation-fMRI experiments on the amygdala of juvenile monkeys.

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REVIEWING:

- Journal: *Scientific Reports*.
- Conference: Computational and Systems Neuroscience (COSYNE), Cognitive Computational Neuroscience (CCN).

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TEACHING:

**National University of Singapore**

Graduate Teaching Assistant

- LSM4213 Systems Neurobiology Fall 2025, Fall 2024
- Beginning Artificial Intelligence Through Neuroscience Fall 2024

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UNIVERSITY SERVICE:

**Edinburgh University Students' Association**

Programme Representative (Biomedical Informatics)

2021 – 2022

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ASSOCIATIONS:

- Society for Neuroscience, Singapore Chapter • ALBA Network

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#### INVITED TALKS:

- Neurobiology Programme, National University of Singapore

Apr. 2025

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#### SELECTED CONFERENCE PRESENTATIONS:

- **Wang, J.**, Shetru, V. J., Kumar, M. G., Libedinsky, C., Yen, S.-C., Tan, A. Y.-Y. and Polepalli, J. S. Unsupervised Hebbian learning drives biologically interpretable pattern separation in a hippocampal–striatal network. Poster presentation delivered at the **AAAI workshop** on Neuro for AI & AI for Neuro, Singapore, January, 2026.
- **Wang, J.**, Shetru, V. J., Kumar, M. G., Libedinsky, C., Yen, S.-C., Tan, A. Y.-Y. and Polepalli, J. S. A biologically plausible computational model of hippocampal neurogenesis and pattern separation in memory. Poster presentation delivered at the 8<sup>th</sup> annual conference on **Cognitive Computational Neuroscience (CCN)** with a short paper, Amsterdam, Netherlands, August, 2025.
- Wang, S., **Wang, J.**, Zhu, W., Cheng, Y., Aydemir, B., Qiu, Y., Gerstner, W., Sandi, C. and Luksys, G. Computational model-based analysis of spatial navigation strategies under stress and uncertainty using place, distance and border cells. Poster presentation delivered at the **Society for Neuroscience (SfN)** meeting, Washington, D.C., November, 2023.

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#### PUBLICATIONS:

- Kong, X., Shu, X., **Wang, J.**, Liu, D., Ni, Y., Zhao, W., Wang, L., Gao, Z., Chen, J., Yang, B., Guo, X. and Wang, Z. (2022) Fine-tuning of mTOR signaling by the UBE4B-KLHL22 E3 ubiquitin ligase cascade in brain development. *Development*. doi: 10.1242/dev.201286.
- Zhang, L., Ma, X., Wu, Z., Liu, J., Gu, C., Zhu, Z., **Wang, J.**, Shu, W., Li, K., Hu, J. and Lv, X. (2022) Prevalence of ground glass nodules in preschool children: a cross-sectional study. *Translational Pediatrics*. doi: 10.21037/tp-22-465.

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#### SKILLS:

- **Languages:** Mandarin (native), English (fluent).
- **Programming Languages:** Python, R, PostgreSQL, Bash. Basics of: C/C++, Java.
- **Applications:** Git,  $\text{\LaTeX}$ .