Yusi Chen

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Education

University of Washington

Swartz Postdoctoral Fellow in Computational Neuroscience — July 2023 - Present

Mentors: Dr. Eric Shea-Brown & Dr. Adrienne Fairhall

University of California, San Diego (UCSD)

Ph.D. in Computational Neuroscience

Mentor: Dr. Terrence Sejnowski — Sept 2017 – June 2023

M.S. in Electrical Engineering

Track: Intelligent Systems, Robotics & Control — Sept 2017 – Feb 2021

Equivalent M.S. in Applied Mathematics

Track: Probability Theory & Applied Statistics — Sept 2017 – June 2022

Tsinghua University

B.S. in Pharmaceutical Sciences; Graduated with honors — Sept 2013 – Jul 2017

Preprints

- Chen, Y., Radulescu, A. & Wu, Z. (2024) Unveiling the latent dynamics in social cognition with multi-agent inverse reinforcement learning. *bioRxiv*
- Cameron, M., Chen, Y. & Sejnowski, T. (2024). A biologically-plausible alternative to backpropagation using pseudoinverse feedback connections. *Accepted to Cosyne 2025*
- Chen, Y., Recanatesi, S., Jiang, P., Rao, R., Mihalas, S., Fairhall, A., & Shea-Brown, E. (2024) How learning regimes shape the emergence of cognitive maps. *in prep*
- Chen, Y., Recanatesi, S., Liu, S., Cohen, J., Shea-Brown, E. (2024) Reinforcement learning constrained state space modeling of neural decisions. *in prep*

Selected Publications

- Chen, Y., Zhang, H., Cameron, M. & Sejnowski, T.J. (2024) Predictive sequence learning in the hippocampal formation. *Neuron* 112, 1-14.
- Chen, Y., Rosen, B. Q. & Sejnowski, T. J. (2022) Dynamical differential covariance recovers directional network structure in multiscale neural systems. *Proceedings of the National Academy of Sciences* 119.24: e2117234119
- Chen, Y., Bukhari, Q., Lin, T.W. & Sejnowski, T.J. (2022) Differential covariance of fMRI predicts structural connectivity and behavior. *Network Neuroscience,* 6.2: 614-633.
- Lin, T. W.*, Chen, Y.*, ... & Sejnowski, T. J. (2020). Differential covariance: A new method to estimate functional connectivity in fMRI. *Neural Computation,* 32(12), 2389-2421.

Awards

Finalist for Washington Research Foundation Postdoctoral Fellowship — Sept 2024

Swartz Postdoctoral Fellowship — June 2023

Kavli-Helinski Fellowship, UCSD — Aug 2021; Aug 2022

National Scholarship of China — Sept 2016

Invited Talks

- Talk on *Unveiling the latent dynamics in social cognition with multi-agent inverse reinforcement learning*, Cold

Spring Harbor Laboratory: from Neuroscience to Artificial Intelligence systems (2024)
- Talk on *Reinforcement learning constrained state space modeling of neural decisions,* Annual Retreat for Swartz Foundation (2024)
- Talk on *Predictive sequence learning in the hippocampal formation*, Neural and Machine Learning Group, University of Oxford (2024)
- Talk on *Predictive sequence learning in the hippocampal formation*, Winter School on Brains and Computation, UCSD (2024)
- Talk on *Predictive sequence learning in the hippocampal formation*, Next Generation Theoretical Neuroscience Symposium, Washington University at St. Louis (2023)
- Guest Lecture on *Predictive coding*, CSE8803, Georgia Tech (2024)
- Guest Lecture on *information-theoretic measurements*, Janelia Theoretical Neuroscience Workshop, (2023)
- Guest Lecture on *Neuroimaging tools,* BIPN147, UCSD *(2021)*

Teaching and mentoring

- Mentor for *Mia Cameron,* mathematics undergraduate at UCSD, co-authored two publications (2023-2024)
- Mentor for *Vikrant Jaltare,* bio-engineering graduate student at UCSD (2023)
- Mentor for *Daniel Lee,* computer science undergraduate student at UCSD (2023-2024)
- TA for Summer Workshop on the Dynamic Brain workshop, Allen Institute (2024)
- TA for Computational Neuroscience, UCSD (2019 & 2021)

Professional Services

- Reviewer for *UK Research and Innovation Funding Service*, *Journal of Neuroscience*, *Proceedings of the National Academy of Sciences*, *The International Conference on Learning Representations, Neural Computation, Network Neuroscience,*
- Organizer for student research seminars and journal clubs

Courses and Skills

- Theoretical courses: Probability Theory; Applied Statistics; Nonlinear Theory; Stochastic Dynamical System; Convex Optimization; Cooperative Control; Statistical Learning; Information Theory.
- Neuroscience courses: Systems Neuroscience; Models of Neurons and Networks; Predictive Mind.
- Computational skills: Python (PyTorch, Jax, Scipy, Matplotlib, Keras and Scikit-learn), MATLAB, R