CATHERINE WANG

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EDUCATION

Duke University | 2021 - present
Ph.D. in Neurobiology

University of California, Berkeley | 2017 - 2021   GPA: 3.81
B.A. (Honors) in Data Science, Concentration: Cognitive Neuroscience

HONORS & AWARDS

Ellen Luken Student Award	Ruth K. Broad Foundation	*Feb 2025*
Trainee Professional Development Award	Society for Neuroscience	*Oct 2024*
Best Graduate Student Talk Award	Duke Neurobiology Retreat	*Sept 2024*
Imaging in the Nervous System selected attendee	Cold Spring Harbor Laboratory	*Jul – Aug 2023*
Workshop on Calcium & Voltage Imaging Analysis selected attendee	Simons Foundation	*Feb 2023*

PUBLICATIONS

Wang, C., Abe, T., Druckmann, S., Li, N. (2026) Learning mechanisms underlying the emergence of persistent modular representations in frontal cortex. *COSYNE.*

Wang, C., Abe, T., Druckmann, S., Li, N. (2025) Emergence of robust persistent activity in premotor cortex across learning. *COSYNE.*

Thomas, A.*, Yang, W.*, **Wang, C**., Tipparaju S.L., Chen, G., Sullivan, B., Swiekatowski, K., Tatam, M., Gerfen C., Li, N. (2023) Superior colliculus bidirectionally modulates choice activity in frontal cortex. *Nature Communications.*

PRESENTATIONS

Talks:

COSYNE Workshops: (2026)	Cascais, Portugal
COSYNE Main Meeting (2025)	Montreal, QC
Duke Neurobiology Recruitment: Student Research Seminar (2025)	Durham, NC
Duke Neurobiology Retreat (2024)	Wrightsville Beach, NC
Baylor College of Medicine Student Research Seminar (2024)	Houston, TX

Abstracts:

Wang, C., Abe, T., Druckmann, S., Li, N. (2026) Learning mechanisms underlying the emergence of persistent modular representations in frontal cortex. *COSYNE (Poster).*

Wang, C., Abe, T., Druckmann, S., Li, N. (2025) Emergence of robust persistent activity in the premotor cortex across learning. *Lake Conference: Neural Coding & Dynamics.*

Abe, T., **Wang, C.**, Li, N., Druckmann, S. (2025) Circuit mechanisms underlying inter-hemispheric learning in premotor cortex. *Society for Neuroscience.*

Wang, C., Abe, T., Druckmann, S., Li, N. (2025) Emergence of robust persistent activity in the premotor cortex across learning. *COSYNE (Talk).*

Wang, C., Abe, T., Druckmann, S., Li, N. (2024) Tracking the emergence and robustness of persistent activity in the premotor cortex across learning. *Society for Neuroscience.*

Wang, C., Abe, T., Druckmann, S., Li, N. (2024) Tracking the emergence and robustness of persistent activity in the premotor cortex across learning. *Cold Spring Harbor Laboratory: Neuronal Circuits.*

Wang, C., Druckmann, S., Li, N. (2023) Tracking the emergence of persistent activity in premotor cortex across learning of motor planning task. *Society for Neuroscience.*

Wang, C., Thomas, A., Chen, G., S., Li, N. (2023) Predicting neural activity and behavioral states with a convolutional neural network trained on high-speed video data. *Rush and Helen Record Forum.*

Wang, C., Thomas, A., Chen, G., S., Li, N. (2023) Predicting neural activity and behavioral states with a convolutional neural network trained on high-speed video data. *11th Annual McNair Symposium.*
Wang, C., Thomas, A., Chen, G., S., Li, N. (2022) Predicting neural activity and behavioral states with a convolutional neural network trained on high-speed video data. *28th Annual UT Health Neuroscience Poster Session.*

RESEARCH EXPERIENCE

Ph.D. Candidate | Duke University, Department of Neurobiology   Durham, NC
Advisor: Dr. Nuo Li   *May 2022 – present*
- Used two-photon calcium imaging to track neuronal populations in mouse cortical brain regions over learning of a motor preparation task, alongside optogenetic silencing to demonstrate cortical decoupling over experience
- Conducted multi-region acute electrophysiological recordings in mouse premotor cortex (Neuropixels 2.0) to demonstrate emerging distributed short-term memory dynamics over three stages of learning
- Built data analysis pipelines in Python and MATLAB to analyze the high-dimensional imaging dataset collected alongside behavioral data, showing both single neuron and population level trends that emerged over motor learning
- Implemented a CNN to predict electrophysiology data from high-speed videos of mice performing behavioral task
- Used in-vivo electrophysiology to collect neuronal dynamics of motor planning in the mouse superior colliculus
- Implemented a generalized linear model with hidden Markov Model observations on decision making outcomes to infer mouse behavioral state, and validated using novel unsupervised learning closed-loop method

Visiting Ph.D. Researcher | Stanford University   Palo Alto, CA
Advisor: Dr. Shaul Druckmann   *July 2025 – Dec 2025*
- Built recurrent neural networks to understand learning principles that give rise to modular organizations in networks
- Tested regimes of emergent modularity across different gradient-based or zero-order training protocols

Research Assistant | UC Berkeley, Helen Wills Neuroscience Institute   Berkeley, CA
Advisor: Dr. Mark D'Esposito   *Aug 2019 – May 2021*
- Processed MRI data of brains after strokes and lesion masks with ANTS software and FMRIB Software Library, making the following transformations: stripping skulls from the scans, normalizing brain gradients, normalizing the voxel dimensions and size, creating regions of interest for the brain and the masks
- Optimized deep learning architecture by creating brain saliency maps in Python that visualized areas of interest with respect to lesions and noticed asymmetry as a predictive trend for lesion identification
- Configured and trained a dual pathway, 11-layer 3-D CNN with a 3-D fully connected CRF post-processing network on MRI scans to automatically segment stroke lesions with high accuracy (76% before post-processing)

Advisor: Dr. Bob Knight   *Aug 2018 – March 2019*
- Collected and processed EEG data from subjects in neurological studies that investigated neural pathways related to binocular rivalry in vision
- Troubleshot and supervised over 30 hours of the experiment, which ran in MATLAB, such that the subject's EEG signals were properly collected with minimal noise that would detract from the data analysis

WORK EXPERIENCE

Software Engineering Intern | NeuroHealth Technologies   *Jan 2021 – June 2021*
- Built tool called Neuro-ART in Python that delivers real-time therapeutic insights of patients from telehealth videos
- Wrote scripts in Python to analyze patient sentiment from physiological measurements and voice audio recordings

Data Science Intern | DataHerald   *May 2020 – May 2021*
- Found, cleaned, and created spatial and time series data visualizations on the effects of COVID from public data sources, APIs and self-implemented web scraping scripts in Python

Data Science Intern | National Geographic Partners   *Jun 2019 – Aug 2019*
- Contextualized 15GB of NG data on Google BigQuery by first transforming data into novel metrics in order to derive clear insights in SQL, then visualized these metrics in specialized formats suited to teams across NG

COMMUNITY SERVICE EXPERIENCE

Graduate Student Council Representative | Baylor College of Medicine   *2021-2023*
- Served on the Outreach & Events committee and organized fundraising events as an elected student representative

Data Science Mentor | University of California, Berkeley   *Aug 2020 – May 2021*
- Mentored UC Berkeley students on the Data Science track regarding classes and career options

SKILLS

Technical Skills: Java, SQL, Python, MATLAB, R, HTML, Bash, ANTS, LaTeX, TensorFlow, PyTorch, Slurm
Tools and Frameworks: Tableau, Adobe Suite, Google Analytics, Photoshop, Jupyter /IPython
Languages: English, French, Chinese (*all native proficiency*)