

# Geeling Chau

in: [geeling](#) | [glchau.github.io](#)

## Education

**California Institute of Technology – Computation and Neural Systems PhD Student (current)** GPA 4.0

- [NSF Graduate Research Fellowship Program](#) Honorable Mention (2022)
- [Predoctoral Training in Quantitative Neuroscience](#) Scholar (2021–2023)
- [Chen Innovator Grant](#) (2024)

**University of California, San Diego – Computer Engineering & Neuroscience (2016–2021)** GPA 3.93

- *Magna Cum Laude* with *Provost Honors* all quarters. Inducted Eta Kappa Nu (2017), Tau Beta Pi (2020).
- Fellowships: [Halicioğlu Data Science Institute Undergraduate Fellowship](#) (2018–2019), [Triton Research and Experiential Learning Scholar](#) (2019–2020)
- Awards: [Henry Memorial Booker Award](#) (2021), [Jacobs School Award of Excellence](#) (2021)

## Research

**Graduate Researcher – PI: Dr. Yisong Yue. Caltech** Jun 2022 – Present

- Researching machine learning techniques for interpretable and robust neural decoding for generalizing across sessions, subject, and sensors (iEEG, LFP, functional Ultrasound (fUS), EMG, and scalp EEG).
- Studied the generalizability of novel time-series encoding approaches (discrete tokenization + transformers) under sensor failure and zero-shot decoding to new sessions and subjects. *Poster presentation at COSYNE 2024.*

**Rotation Student – Caltech CNS** Sep 2021 – Jun 2022

- Spring Quarter – PI: Dr. Yisong Yue. Studied an adversarial network applied to brain-machine interface (BMI) data to learn session variability and improve decodability across recording sessions.
- Winter Quarter – PIs: Dr. Richard Andersen and Dr. Mikhail Shapiro. Studied functional UltraSound (fUS) as a new technology for BMI and high temporal / spatial resolution neuroscience studies. Experimented with cross-session data alignment techniques for improved data efficiency and decodability for fUS BMI. *Manuscript in preparation.*
- Fall Quarter – PIs: Dr. Ueli Rutishauser and Dr. Ralph Adolphs. Studied Single Neurons related to Error Monitoring in relation to brain structural differences in MRI scans. *Poster presentation at Human Single Neuron 2022.*

**Research Assistant – PI: Dr. Vikash Gilja. UC San Diego** Sep 2019 – Sep 2021

- Extracted temporal and populational neural features from sEEG data to predict low vs high valence, arousal, and dominance dimensions. Performed data driven (PCA + ICA) brain region frequency coherence analysis, Power Spectral Density (PSD) fitting and parameterization, LDA linear model feature interpretation, and unsupervised clustering analysis on auditory valence neural data. *Poster presentation at SfN 2022.*
- Designed and developed a target pursuit task with perturbations to simulate loss-of-control scenarios during game play. Assisted in EEG and eye tracking analysis synchronized with healthy subject gameplay to validate games for emotional tempering. Identified game play behavioral differences w/r to VAD scores and performed ERP analysis on EEG to identify Error Related Negativity (ERN) near onset of frustration events. *IEEE EMBC 2021 paper.*

**Focus and Flow Detector – PIs: Dr. Gilja and Dr. Virginia de Sa. UC San Diego** Sep 2019 – Jun 2020

- Built a real-time EEG focus decoder with *OpenBCI headset* data and *Python*, complete with calibration experiment, eye tracking, real-time EEG filtering + artifact processing, and focus model prediction. Offline classification using Shallow FBCSP CNN achieved 70% accuracy with 2 forehead electrodes. Funded by [Triton Research and Experiential Learning Scholars](#). *Presented in a lab meeting and wrote a report.*

**Research Assistant – PI: Dr. Bradley Voytek. UC San Diego** Nov 2018 – Jun 2019

- Studied EEG neural correlates of visual working memory load with power spectral density parameterization. Funded by [Halicioğlu Data Science Institute Undergraduate Fellowship](#). *Poster presentation at 2019 HDSI Conference.*

## Posters

- Chau, G.**, An, Y., Iqbal, A. R., Chung, S.-J., Yue, Y., & Talukder, S. (2024). Generalizability Under Sensor Failure: Tokenization + Transformers Enable More Robust Latent Spaces. *2024 Computational and Systems Neuroscience*. Lisbon, Portugal. Mar 1, 2024. Poster.
- Chau, G.**, Fu, Z., Mamelak, A., Tyszk, M., Adolphs, R., Rutishauser, U. (2022) Paracingulate Sulcus presence affects single neuron responses to errors in human medial frontal cortex. *2022 Human Single Neuron Conference*. Los Angeles, CA. Nov 10, 2022. Poster.
- Patel, A. N., Huang, J., **Chau, G.**, Ben-Haim, S., Jung, T.-P., & Gilja, V. (2022) Affect modeling of stereoencephalographic signals during naturalistic acoustic stimuli. *2022 Society for Neuroscience*. San Diego, CA. Nov 15, 2022. Poster.
- Chau, G.**, Engen, Q. V., Voytek, B. (2019) Predicting Working Memory Capacity with Visual Memory Tasks. Halicioğlu Data Science Institute (HDSI) Annual Conference. San Diego, CA. June 2019. Poster.

## Publications

- Chau, G.**, Wang, C., Talukder, S., Subramaniam, V., Soedarmadji, S., Yue, Y., Katz, B., & Barbu, A. (2024). Population Transformer: Learning Population-level Representations of Neural Activity. Retrieved October 17, 2024, ArXiv.org. <https://arxiv.org/abs/2406.03044>
- Chau, G.**, An, Y., Iqbal, A. R., Chung, S.-J., Yue, Y., & Talukder, S. (2024). Generalizability Under Sensor Failure: Tokenization + Transformers Enable More Robust Latent Spaces. ArXiv.org. <https://arxiv.org/abs/2402.18546>
- Griggs, W. S., Norman, S. L., Deffieux, T., Segura, F., Osmanski, B.-F., **Chau, G.**, Christopoulos, V., Liu, C., Mickael Tanter, Shapiro, M. G., & Andersen, R. A. (2023). Decoding motor plans using a closed-loop ultrasonic brain-machine interface. *Nature Neuroscience*. <https://doi.org/10.1038/s41593-023-01500-7>
- Patel, A. N., **Chau, G.**, Chang, C., Sun, A., Huang, J., Jung, T.-P., & Gilja, V. (2021). Affective response to volitional input perturbations in obstacle avoidance and target tracking games. *2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*. <https://doi.org/10.1109/embc46164.2021.9630523>

## Leadership and Other Activities

- Graduate Student Advisor @ NeuroTechX @ Caltech Jan 2024 – Present
- Board Member @ [NeuroTechers](#) Jun 2022 – Present
- Chapter Coach @ [Eta Kappa Nu \(HKN\): Honor Society of IEEE](#) Sep 2022 – Jun 2023
- Board of Directors @ [Caltech Graduate Student Council \(GSC\)](#) Jun 2022 – Jun 2023
- President, Co-Founder @ [NeuroTech @ UCSD](#) Sep 2019 – Jun 2021
- President, Officer @ [Eta Kappa Nu \(HKN\): Honor Society of IEEE, Kappa Psi](#) Jun 2017 – Jun 2020
- Computer Science Tutor @ [UC San Diego CSE](#) Sep 2017 – Jun 2019
- Software Engineering Intern @ [Microsoft](#) Summers 2018, 2019, 2020
- Software Engineering Intern @ [Intuit](#) Summer 2017