

# Geeling Chau

in: geeling | [glchau.github.io](https://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)
- [PIMCO Fellowship](#) (2025-2026)

### 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: [Halıcıoğlu 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, EMG, and scalp EEG). *ICLR 2025 (oral) + ICML/NeurIPS workshops.*
- 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.*

### Machine Learning Intern - Manager: Chris Sandino. Apple May 2025 - Sept 2025

- Researched methods to improve adaptability of biosignal pretrained models to new devices. *In preparation.*
- Set up new experiments on prototype devices to establish utility of multimodality inputs for enabling new feature use cases. *Demoed to Apple SVP Leadership.*

### 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. *Contribution to Nature paper.*
- 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 [Halıcıoğlu Data Science Institute Undergraduate Fellowship](#). *Poster presentation at 2019 HDSI Conference.*

## Publications

- Patel, E., Yue, Y., & **Chau, G.** (2025). Learning Time-Scale Invariant Population-Level Neural Representations. *NeurIPS 2025 Workshop on Foundation Models for the Brain and Body*. [https://arxiv.org/pdf/2511.13022](https://arxiv.org/pdf/2511.13022.pdf)
- Sandino, C., Lala, S., **Chau, G.**, Ayoughi, M., Mahasseni, B., Zippi, E., Moin, A., Azemi, E., & Goh, H. (2025). Learning the relative composition of EEG signals using pairwise relative shift pretraining. *NeurIPS 2025 Workshop on Foundation Models for the Brain and Body*. <https://arxiv.org/abs/2511.11940>
- Mahato, S. P., Xiao, J., Andre, A., **Chau, G.**, Ma, W., Knight, I. J., Nguyen, D., Hu, L. J., Brunton, B. W., Beauchamp, M. S., Bijan Pesaran, Shubaev, S. A., & Dyer, E. L. (2025). A scalable self-supervised method for modeling human intracranial recordings during natural behavior. *NeurIPS 2025 Workshop on Foundation Models for the Brain and Body*. <https://openreview.net/forum?id=CdP8Y4K4fz>
- Zahorodnii, A., Wang, C., Stankovits, B., Moraitaki, C., **Chau, G.**, Barbu, A., Katz, B., & Fiete, I. R. (2025). Neuroprobe: Evaluating Intracranial Brain Responses to Naturalistic Stimuli. ArXiv.org. <https://arxiv.org/abs/2509.21671>
- Chau, G.**, Wang, C., Talukder, S., Subramaniam, V., Soedarmadji, S., Yue, Y., Katz, B., & Barbu, A. (2025). Population Transformer: Learning Population-level Representations of Neural Activity. *2025 13th International Conference on Representation Learning*. <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. *COSYNE 2024*. <https://arxiv.org/abs/2402.18546>
- van Engen, Q., **Chau, G.**, Smith, A., Adam, K., Donoghue, T., & Voytek, B. (2024). Dissociating Contributions of Theta and Alpha Oscillations from Aperiodic Neural Activity in Human Visual Working Memory. *BioRxiv*. <https://doi.org/10.1101/2024.12.16.628786>
- 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>

## Talks

- Population Transformer: Learning Population-level Representations of Neural Activity. *Apple Neural Nexus Journal Club*. Jul 21, 2025.
- Population Transformer: Learning Population-level Representations of Neural Activity. *BCI Society 2025 Workshop on Large neural data models for brain-computer interfaces*. Banff, BC, Canada. Jun 5, 2025.
- Population Transformer: Learning Population-level Representations of Neural Activity. *ICLR 2025 Oral*. Singapore. Apr 25, 2025.
- Population Transformer: Learning Population-level Representations of Neural Activity. *COSYNE 2025 NeuroFM Workshop*. Montreal, QC, Canada. [Video](#). Mar 31, 2025.
- Learning to Denoise EEG Data. *Chen Institute Innovator Seminar*. Pasadena, CA. Feb 27, 2025.
- Transformers for Neural Time Series: From Large-scale Pretraining to Insight. *Chen Institute AI for Neuro Workshop*. Pasadena, CA. Dec 6, 2024.

## Posters

- Chau, G.**, Wang, C., Talukder, S., Subramaniam, V., Soedarmadji, S., Yue, Y., Katz, B., & Barbu, A. (2025). Population Transformer: Learning Population-level Representations of Neural Activity. *2025 13th International Conference on Representation Learning*. Apr 25, 2025. Poster.
- 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., Tyszka, 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 stereoecephalographic 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. Halıcıoğlu Data Science Institute (HDSI) Annual Conference. San Diego, CA. June 2019. Poster.

## Leadership and Other Activities

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| ● Machine Learning Intern @ <a href="#">Apple</a>   | May 2025 – Sept 2025     |
| ● Board Member @ <a href="#">NeuroTechers</a>   | Jun 2022 – Present       |
| ● Chapter Coach @ <a href="#">Eta Kappa Nu (HKN): Honor Society of IEEE</a>                 | Sep 2022 – Jun 2023      |
| ● Board of Directors @ <a href="#">Caltech Graduate Student Council (GSC)</a>               | Jun 2022 – Jun 2023      |
| ● President, Co-Founder @ <a href="#">NeuroTech @ UCSD</a>                                  | Sep 2019 – Jun 2021      |
| ● President, Officer @ <a href="#">Eta Kappa Nu (HKN): Honor Society of IEEE, Kappa Psi</a> | Jun 2017 – Jun 2020      |
| ● Computer Science Tutor @ <a href="#">UC San Diego CSE</a>                                 | Sep 2017 – Jun 2019      |
| ● Software Engineering Intern @ <a href="#">Microsoft</a>                                   | Summers 2018, 2019, 2020 |
| ● Software Engineering Intern @ <a href="#">Intuit</a>                                      | Summer 2017              |