

# Ewina Tsam Kiu Pun

Ph.D. Candidate in Biomedical Engineering  
M.S. in Computer Science at Brown University

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## Experience

- 2018–present **BrainGate Clinical Trial Consortium**, *Student Researcher*, Providence, RI.  
Advisor: Prof. Leigh Hochberg
- Led research on methods to improve the stability and reliability of an intracortical brain-computer interface system, collaborating in a multi-disciplinary team of 50+ to restore communication and mobility for people with paraplegia.
  - Developed real-time tracking algorithms to monitor neural instability in *in vivo* neuro-physiological signals and RNN-based decoders to improve decoding stability to 3-months continuous use rather than relying on daily recalibration.
  - Managed and coached 3 undergraduates, onboard over 20 new team members, created and led standardized, week-long introductory course annually, - introduced the adoption of Github version control, built and launched internal website to facilitate knowledge transfer and accessibility.
- 2023–present **BATS Machine Learning Research Group**, *Student Researcher*, Providence, RI.  
Advisor: Prof. Stephen Bach
- Current Master Project: Effective Long-term Neural Decoding with Meta-Learning.
  - Proficient in weakly supervised/ self-supervised training from past course on Learning on Limited Labeled Data.
- Summer 2021 **Neuromatch Academy**, *Teaching Assistant*, Virtual.
- Taught computational neuroscience to a group of 10 graduate students, led discussions, and guided two research projects using the Allen Institute 2-Photon dataset.
- 2017–2018 **USC Shanechi Lab**, *Undergraduate Researcher*, Los Angeles, CA.  
Advisor: Prof. Maryam Shanechi
- Implemented an adaptive subspace identification algorithm to enable online tracking and predicting neural dynamics for closed-loop BCI control.
  - Graduation EE Thesis: [Adaptive Subspace Identification Algorithm for Dynamic Tracking](#).
- Summer 2016 **Abbott Vascular**, *Engineering Intern*, Temecula, CA.
- Supported quality control of finished goods (Absorb GT1TM bioresorbable vascular scaffolds and catheter tubes); - Proposed a \$20,000+ cost saving project and streamlined equipment testing and replacement across European and American sites.
- 2015–2017 **USC Biomedical Microsystems Lab**, *Undergraduate Researcher*, Los Angeles, CA.  
Advisor: Prof. Ellis Meng
- Designed brain-implantable sensors with lithography microfabrication, rapid prototyping and real-time experiment control.
  - Received interdisciplinary award at the [Undergraduate Symposium](#), titled *A Biocompatible Impedance-based Microbubble Pressure Transducer to Treat Hydrocephalus Patients* (one awardee across all life sciences); also awarded Provost's undergraduate research fellowship each semester.

## Technical Skills

- Programming Python, MATLAB, C/C++, Julia, PyTorch, Tensorflow, Jupyter Notebooks.
- Analytic Skills Machine learning, deep learning, statistical inference and modeling, time series data analysis, neural signal processing, spike sorting, system identification, behavioral experimental design, data curation.

## Honors and Awards

- 2021 T32 training program supported by NIH NIMH (T32-MH115895) for Interactionist Cognitive Neuroscience (2 years; full ride)
- 2019 Croucher Foundation scholarship for Hong Kong doctoral students (2 years; full ride)
- 2014 USC Presidential Scholarship and Hong Kong Schools Alumni Federation Scholarship Foundation (4-year; full ride)

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## Selected publications

### Journal

- 2024 **T. K. Pun**, M. Khoshnevis, T. Hosman, G. H. Wilson, A. Kapitonava, F. Kamdar, J. M. Henderson, J. D. Simeral, C. E. Vargas-Irwin, M. T. Harrison, L. R. Hochberg. Measuring instability in multi-day human intracortical neural recordings towards stable, long-term brain-computer interfaces. Submitted. Under review. ([link](#))
- 2023 G. H Wilson, E. A. Stein, F. Kamdar, D. T. Avansino, **T. K. Pun**, R. Gross, T. Hosman, T. Singer-Clark, A. Kapitonava, L. R. Hochberg, J. D. Simeral, K. V. Shenoy, S. Druckmann, J. M. Henderson, F. R. Willett. Long-term unsupervised recalibration of cursor BCIs. Submitted. Under review.

### Proceedings

- 2023 **T. K. Pun\***, T. Hosman\*, A. Kapitonava, J. D. Simeral, L. R. Hochberg. Months-long high-performance fixed LSTM decoder for cursor control in human intracortical brain-computer interfaces. IEEE/EMBS Conference on Neural Engineering (NER). *Baltimore, MD*. pp. 1-5. \*equal contributions. ([link](#)) ([paper](#))

### Conferences

- 2023 J. Jude, **T. K. Pun**, T. Hosman, C. Nicolas, A. Kapitonava, J. N. Kelemen, L. R. Hochberg, D. Rubin. Spatiotemporal transformers accommodate future neural nonstationarities for iBCIs with minimal training data through contrastive learning. SfN. *Washington, D.C.*
- 2022 **T. K. Pun**, T. Hosman, A. Kapitonava, C. E. Vargas-Irwin, J.D. Simeral, M. T. Harrison, L. R. Hochberg. Tracking nonstationarity In multi-day intracortical neural recordings during iBCI cursor control by a person with tetraplegia. SfN. *San Diego, CA*.
- 2019 **T. K. Pun**, A. Catoya, C. E. Vargas-Irwin, S. S. Cash, J. D. Simeral, L. R. Hochberg. Identifying changes in volitional state and BCI task engagement based on the intrinsic structure of neural ensemble activity patterns in motor cortex of people with tetraplegia. SfN. *Chicago, IL*.

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## Community Services

- 2022-present **Brown Neurotech Journal Club**, *Founder and Organizer*, Providence, RI.
- 2022-2023 **BrainPost**, *Occasional writer*, remote.
- 2021-2023 **Brown Biomedical Engineering and Biotechnology Graduate Advisory Board**, *Program Cohesion Committee*, Providence, RI.

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## Education

- 2018–2024 **Ph.D. in Biomedical Engineering**, *Brown University*, Providence, RI.  
(*expected*) Cumulative GPA 4.00  
Topic: *Toward the Development of Stable and Reliable Intracortical Brain-Computer Interface Systems for Independent, Continuous, Multi-effector Use.*  
Past courses: Topics in Bioelectronics, Statistical Neuroscience, Methods in Informatics and Data Science, From Concept to Startup: Neurotech
- 2022–2024 **M.S. in Computer Science (AI/ML track)**, *Brown University*, Providence, RI.  
Cumulative GPA: 4.00  
Past courses: Deep Learning, Machine Learning, Design/Analysis of Algorithms, Learning: Limited Labeled Data, Responsible Computer Science (Ethics), Real Analysis
- 2017–2018 **M.S. in Biomedical Engineering**, *University of Southern California*, Los Angeles, CA.  
Graduation GPA: 3.81 – *Magna Cum Laude*
- 2014–2018 **B.S. in Electrical Engineering**, *University of Southern California*, Los Angeles, CA.  
Graduation GPA: 3.78 – *Magna Cum Laude*