

# Ewina Tsam Kiu Pun

*Ph.D. in Biomedical Engineering*  
*M.S. in Computer Science*

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## Education

- 2018 – 2024 **Ph.D. in Biomedical Engineering**, *Brown University*.  
GPA: 4.00 – Advisor: Prof. Leigh Hochberg  
Topic: *Towards Stable & Reliable Intracortical Brain-Computer Interfaces for Long-term Independent Use*.
- 2022 – 2024 **Sc.M. in Computer Science (AI/ML track)**, *Brown University*.  
GPA: 4.00 – Advisor: Prof. Stephen Bach  
Topic: *Long-term Effective Neural Decoding with Meta-Learning*.
- 2017 – 2018 **M.S. in Biomedical Engineering**, *University of Southern California*.  
GPA: 3.81 – Advisor: Prof. Maryam Shanechi  
Topic: *Adaptive Subspace Identification Algorithm for Dynamic Tracking*.
- 2014 – 2018 **B.S. in Electrical Engineering**, *University of Southern California*.  
GPA: 3.78 – Advisor: Prof. Ellis Meng  
Topic: *A Biocompatible Impedance-based Microbubble Pressure Transducer to Treat Hydrocephalus*.

## Industry Experience

- Summer 2024 **Forest Neurotech**, *ML Software Engineer Intern*, Palo Alto, CA.
- Designed a motion filtering and correction algorithm using computer vision toolkit to stabilize functional ultrasound imaging, which improved the precision and reliability by more than 60%.
  - Accelerated data analysis time from days to less than 5 minutes by automating the image pre-processing pipeline, and migrated team onto a MLOps platform to enable real-time visualization during recording sessions.
  - Revamped the data infrastructure using the BIDS standard format, which simplified the process of data sharing with external stakeholders.
- Summer 2016 **Abbott Vascular**, *Engineering Intern*, Temecula, CA.
- Supported quality control of finished goods (Absorb GT1™ bioresorbable vascular scaffolds and catheter tubes).
  - Proposed a \$20,000+ cost savings project and streamlined equipment testing and replacement across European and American sites.

## Academic Research

- 2018 – 2024 **BrainGate Clinical Trial Consortium**, *Graduate Researcher*, Providence, RI.
- *Thesis Advisor: Prof. Leigh Hochberg*
  - Designed the next-gen intracortical brain-computer interfaces to restore communication and mobility for people with paraplegia with a multi-disciplinary team of 50+ across 4 clinical sites.
  - Developed, deployed, and tested an algorithm to monitor neural instability in *in vivo* neurophysiological signals from BrainGate2 clinical trial participants in real-time during sessions.
  - Extended cursor control stability from daily recalibration to 3-months continuous use without needing any recalibration, enabling independent iBCI use for clinical trial participants.
  - Developed a novel meta-learning model that enables quick within-day adaptation, significantly reducing adaptation time from 5 mins to 20 seconds.
  - Analyzed and curated years worth of clinical neural and behavioral data from participants.
  - Built and launched a new internal website to facilitate knowledge transfer and accessibility.
  - Migrated team to use GitHub for better code management, establishing best practices that streamlined version control and reduced integration conflicts.
- 2017 – 2018 **USC Shanechi Lab**, *Undergraduate Researcher*, Los Angeles, CA.
- Implemented an adaptive subspace identification algorithm to enable online tracking and predicting neural dynamics for closed-loop BCI control.
- 2015 – 2017 **USC BioMEMS Meng Lab**, *Undergraduate Researcher*, Los Angeles, CA.
- Designed brain-implantable sensors with lithography microfabrication, rapid prototyping, and real-time experiment control. Bench-tested using trapped microbubbles in polymer MEMS microcapsules as a novel pressure-sensing method.

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## Teaching

- Summer 2021 **Neuromatch Academy**, *Teaching Assistant*, Virtual.
- Taught computational neuroscience to a group of 10 graduate students and led discussions.
  - Guided two final research projects using the Allen Institute 2-photon dataset.
- 2019 **Brown University Dept. of Neuroscience**, *Teaching Assistant*, Providence, RI.
- Redesigned course material for Statistical Neuroscience (taught by Prof. Wilson Truccolo), including a full set of homework assignments and solutions in Python.

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## Honors and Awards

- 2021 – 2023 T32 training program supported by NIH NIMH (T32-MH115895) for Interactionist Cognitive Neuroscience (2 years; full-ride: **\$194,500**)
- 2019 – 2021 Croucher Foundation scholarship for HK doctoral students (2 years; full-ride: **\$199,000**)
- 2017 USC Undergraduate Symposium for Scholarly and Creative Work - Interdisciplinary award (one awardee in all life sciences: **\$1,000**)
- 2015 – 2017 USC Provost's Undergraduate Research Fellowship: **\$1,000/semester**
- 2016 USC Academic Achievement Awards: **\$5,000/semester**
- 2014 – 2018 USC Presidential Scholarship and Hong Kong Schools Alumni Federation Scholarship Foundation (4-year; full-ride: **\$241,100**)

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## Selected publications

[more on Google Scholar](#)

- 2024 **Measuring instability in multi-day human intracortical neural recordings towards stable, long-term brain-computer interfaces.**  
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.  
*Nature Communications Biology*. 7, Article no. 1363.
- 2024 **Gesture encoding in human left precentral gyrus neuronal ensembles.**  
C. Vargas-Irwin, T. Hosman, J. T. Gusman, T. K. Pun, J. D. Simeral, T. Singer-Clark, A. Kapitonava, C. Nicolas, N. P. Shah, D. Avansino, F. Kamdar, Z. Williams, J. M. Henderson, L. Hochberg. *In review*.
- 2023 **Long-term unsupervised recalibration of cursor BCIs.**  
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. *In review*.
- 2023 **Months-long high-performance fixed LSTM decoder for cursor control in human intracortical brain-computer interfaces** ([paper](#))  
T. K. Pun\*, T. Hosman\*, A. Kapitonava, J. D. Simeral, L. R. Hochberg. \*equal work  
*IEEE/EMBS Conference on Neural Engineering (NER)*. pp. 1-5.
- 2016 **A Contactless Electrochemical Impedance Measurement Method** ([paper](#))  
L. Yu, T. K. Pun, E. Meng.  
*Hilton Head: A Solid State Sensors, Actuators and Microsystems Workshop*. p. 121

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## Technical Skills

- Programming Python, MATLAB, PyTorch, Tensorflow, scikit-learn, Redis, Pandas, C++, Illustrator, Git.
- Analytic Skills Machine learning, deep learning, statistical inference, system identification, control design, time-series data analysis, signal processing, behavioral experimental design, data curation.

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## Community Services

- 2022 – 2024 **Brown Neurotech Journal Club**, *Founder and Organizer*, Providence, RI.
- 2022 – 2023 **BrainPost**, *Invited writer*, remote.
- 2021 – 2023 **Brown BME and Biotech Graduate Advisory Board**, *Program Cohesion Committee*, Providence, RI.