Ewina Tsam Kiu Pun

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

Providence, RI
+1(626)817-1299
ewinatkpun@gmail.com
ewinapun.com

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**, *Machine Learning Research Intern*, Palo Alto, CA.

- Designed a motion filtering and correction algorithm 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 preprocessing pipeline, and migrated team onto a MLOps platform to enable real-time data 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 GT1TM 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.
- Improved decoding stability to 3-month continuous cursor control using an RNN decoder instead of daily recalibration. Analyzed and curated large-volume clinical neural and behavioral data.
- Managed and advised 4 undergraduates, onboarded over 20 new team members, created and led a standardized, week-long introductory course annually.
- 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.

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.

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**)

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. In press.

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

Technical Skills

Programming Python, MATLAB, C/C++, Julia, PyTorch, Tensorflow, scikit-learn, Adobe Illustrator.

Analytic Skills Machine learning, deep learning, statistical inference and modeling, time-series data analysis, neural signal processing, behavioral experimental design, data curation and visualization.

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.