Jiaang Yao

Curriculum Vitae

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Education

2021 – 2026 **University of California, Berkeley/University of California, San Francisco**
Berkeley, CA Ph.D., Bioengineering
Advisor: Philip Starr

2018 – 2021 **Columbia University**
New York, NY M.S., Electrical Engineering
Integrated EE BS/MS Program

B.S., Electrical Engineering
summa cum laude, Tau Beta Pi, Joint BA/BS 3-2 Program

2015 – 2020 **Wesleyan University**
Middletown, CT B.A., Biology, Mathematics, Neuroscience and Behavior
Phi Beta Kappa, Joint BA/BS 3-2 Program

Research Interests

Neuroengineering and neurorehabilitation: brain-machine interfaces; deep brain stimulation; motor control; machine learning; signal processing; applied statistics; convex optimization

Research Experience

2020 – 2021 **Research Assistant**, Columbia University Irving Medical Center
Advisor: Jason Carmel

- Designed a decoder for predicting forelimb movement in rats using electrocorticography (ECoG) data.
- Implemented MATLAB scripts for controlling behavioral task experiments and closed-loop stimulation sessions.
- Performed animal training and administered data recording sessions.
- Configured data collection pipeline and designed experiment protocols.

2018 – 2021 **Research Assistant**, Columbia University
Advisor: Paul Sajda

- Developed a state-space model algorithm for predicting the instantaneous phase of local field potential rhythms in real time.
- Devised multimodal neural network models that utilize features from volumes of optical coherence tomography angiography images for diagnosing neovascular age-related macular degeneration.

- Designed the first recurrent neural network model for ballistocardiogram (BCG) artifact suppression in simultaneous EEG-fMRI recordings that significantly outperformed the current state of the art.
- Implemented an open-source Python toolbox called BCGNet for users to train neural network models for suppressing BCG artifact.

2016 – 2018 **Research Assistant**, Wesleyan University
Advisor: Michael Weir

- Modeled interactions between 530-loop region of ribosome and mRNA during protein translation using support vector machines.
- Performed molecular dynamics analysis of ribosome during protein translation using AMBER.

Fellowships

2021 – 2023 **Berkeley Fellowship for Graduate Study**
Role: Graduate Fellow; Award amount: $34000
Supported in part by the TUYF Charitable Trust Fund for Graduate Fellowships in Medical Science, Oceanography and Environmental Science

Summer 2019 **Summer@SEAS at Columbia University**
Role: Summer Fellow; Award amount: $5000

Summer 2016 **QAC Summer Apprentice at Wesleyan University**
Role: Summer Fellow; Award amount: $4000

Honors and Awards

2022 **Erwin Howard Armstrong Memorial Award (MS)**, Columbia University
Awarded annually by the Faculty of Electrical Engineering to one outstanding candidate for the M.S. degree

2020 **Erwin Howard Armstrong Memorial Award (BS)**, Columbia University
Awarded annually by the Faculty of Electrical Engineering to one outstanding candidate for the B.S. degree

2018 – 2020 **Dean's List**, All Available Semesters, Columbia University
Awarded in all semesters when mandatory Pass/Fail grading was not in place due to COVID19

2019 **Phi Beta Kappa Honor Society**, Fall Induction, Wesleyan University
Limited to 15 graduating seniors from the class of 2020

2019 **Tau Beta Pi Honor Society**, Spring Induction, Columbia University
Top 12% of the class of 2020 at Columbia Engineering

2015 – 2018 **Dean's List**, All Semesters, Wesleyan University

2017 **Plukas Teaching Apprentice Award**, Wesleyan University
Awarded to outstanding course assistants in Economics department

Publications

∗ authors contributed equally

Peer-Reviewed Journal Articles

J2. K. A. Thakoor, **J. Yao**, D. Bordbar, O. Moussa, W. Lin, P. Sajda, and R. W. Chen, "A multimodal deep learning system to distinguish late stages of amd and to compare expert vs. ai ocular biomarkers," *Scientific Reports*, vol. 12, no. 1, pp. 1–11, 2022. DOI: 10.1038/s41598-022-06273-w

J1. J. R. McIntosh*, **J. Yao***, L. Hong, J. Faller, and P. Sajda, "Ballistocardiogram artifact reduction in simultaneous EEG-fMRI using deep learning," *IEEE Transactions on Biomedical Engineering*, vol. 68, no. 1, pp. 78–89, 2021. DOI: 10.1109/TBME.2020.3004548

Peer-Reviewed Conference Proceedings

C1. K. Thakoor, D. Bordbar, **J. Yao**, O. Moussa, R. Chen, and P. Sajda, "Hybrid 3D-2D deep learning for detection of neovascular age-related macular degeneration using optical coherence tomography b-scans and angiography volumes," *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)*, pp. 1600–1604, 2021. DOI: 10.1109/ISBI48211.2021.9434111

Presentations

∗ authors contributed equally

Conference Abstracts

A1. K. Thakoor, D. Bordbar, **J. Yao**, O. Moussa, W. Lin, I. Scherbakova, V. Diaconita, P. Sajda, and R. Chen, "A hybrid deep learning system to distinguish late stages of amd and to compare expert vs. machine amd risk features," *Investigative Ophthalmology & Visual Science*, vol. 62, no. 8, pp. 2146–2146, 2021

Poster Presentations

P2. **J. Yao***, Y. Lin*, J. R. McIntosh, L. Hong, J. Faller, and P. Sajda, "BCGNet: A deep learning toolbox for ballistocardiogram artifact suppression in EEG-fMRI recordings," in *2020 IEEE Brain Workshop on Advanced Neurotechnologies*, Oct. 2020

P1. **J. Yao**, J. W. Glickman, D. Krizanc, and M. P. Weir, "Refining a model for rRNA base pairing to mRNA during protein translation," in *17th Annual Biophysics Retreat of Wesleyan University*, Middletown, CT, Sep. 2016

Teaching Experience

Spring 2021	**Course Assistant**, Columbia University ECBM E4040: Neural Networks and Deep Learning
Fall 2020	**Course Assistant**, Columbia University ECBM E4040: Neural Networks and Deep Learning
Spring 2020	**Lab Assistant**, Columbia University ELEN E3082: Digital Electronics Laboratory
Fall 2018	**Teaching Assistant**, Wesleyan University BIOL 181: Principles of Biology I: Cell Biology and Molecular Basis of Heredity

Fall 2016 **Course Assistant**, Wesleyan University
ECON 110: Introduction to Economic Theory

Professional Service

Journal Reviewer
Neural Plasticity

Professional Membership
Institute of Electrical and Electronics Engineers (IEEE)
American Society of Biochemistry and Molecular Biology (ASBMB)

Technical Skills

Programming: Python, MATLAB, CUDA, Java, Unity, C
Language: Mandarin (Native), Japanese (Intermediate), Italian (Elementary)