

# Jiaang Yao

Curriculum Vitae

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## Education

2021 – 2026 Berkeley, CA	<b>University of California, Berkeley/University of California, San Francisco</b> Ph.D., Bioengineering Advisor: Philip Starr
2018 – 2021 New York, NY	<b>Columbia University</b> M.S., Electrical Engineering Integrated EE BS/MS Program B.S., Electrical Engineering <i>summa cum laude</i> , Tau Beta Pi, Joint BA/BS 3-2 Program
2015 – 2020 Middletown, CT	<b>Wesleyan University</b> B.A., Biology, Mathematics, Neuroscience and Behavior Phi Beta Kappa, Joint BA/BS 3-2 Program

## Research Interests

Parkinson's disease; deep brain stimulation (DBS); movement disorder; basal ganglia and cortical neurophysiology; tremor; dystonia; therapy of neurodegenerative disorders

## Research Experience

2020 – 2021	<b>Research Assistant</b> , Columbia University Irving Medical Center Advisor: Jason Carmel <ul style="list-style-type: none"><li>Designed a decoder for predicting forelimb movement in rats using electrocorticography (ECoG) data.</li><li>Implemented MATLAB scripts for controlling behavioral task experiments and closed-loop stimulation sessions.</li><li>Performed animal training and administered data recording sessions.</li><li>Configured data collection pipeline and designed experiment protocols.</li></ul>
2018 – 2021	<b>Research Assistant</b> , Columbia University Advisor: Paul Sajda <ul style="list-style-type: none"><li>Developed a state-space model algorithm for predicting the instantaneous phase of local field potential rhythms in real time.</li><li>Devised multimodal neural network models that utilize features from volumes of optical coherence tomography angiography images for diagnosing neovascular age-related macular degeneration.</li></ul>

- 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 the 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	<b>Course Assistant</b> , Columbia University ECBM E4040: Neural Networks and Deep Learning
Fall 2020	<b>Course Assistant</b> , Columbia University ECBM E4040: Neural Networks and Deep Learning
Spring 2020	<b>Lab Assistant</b> , Columbia University ELEN E3082: Digital Electronics Laboratory
Fall 2018	<b>Teaching Assistant</b> , 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 (ad-hoc)**

*Neural Plasticity, NeuroImage: Clinical*

**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)