

CHING FANG

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EDUCATION

Columbia University

Aug 2019-present

PhD candidate in Neurobiology & Behavior

Advisors: Larry Abbott, Dmitriy Aronov

University of California, Berkeley

December 2018

B.A. in Computer Science, B.A. in Molecular & Cell Biology (Honors)

AWARDS

2019 National Science Foundation Graduate Research Fellow

2018 IL Chaikoff Award for excellence in U.C. Berkeley's neuroscience program

2018 Best presentation award at Molecular & Cell Biology undergraduate symposium

2018 Dean's Honors List in recognition of academic performance

PUBLICATIONS & CONFERENCE POSTERS

Fang, C., Aronov, D., Abbott, L. F., Mackevicius, E. [Neural learning rules for generating flexible predictions and computing the successor representation.](#) *bioRxiv* (2022)

Vendrell-Llopis, N., **Fang, C.**, Qu, A., Costa, R., Carmenta, J. [Diverse operant control of different motor cortex populations.](#) *Current Biology* (2022)

Tyulmankov, D.*, **Fang, C.***, Vadaparty, A., and Yang, G.R. [Biological key-value memory networks.](#) (*NeurIPS 2021*; * equal contribution).

Fang, C., Laboy-Juarez, K., Feldman, D. Neural Coding of Whisker Timing in Multi-Whisker Sensation. California Cognitive Science Conference, 2018

RESEARCH EXPERIENCE

Abbott/Aronov Lab | Columbia Theoretical Neuro. Center

Aug 2019 - present

- Designing recurrent neural networks (RNNs) to compute reinforcement learning (RL) representations as a model of long-term memory formation and retrieval.
- Analyzing and modeling neural data from the hippocampus of food-caching birds.

Yang Lab | MIT Brain & Cognitive Sciences

Jan 2021 - present

- Developing neurally-plausible learning rules to implement the key-value storage and attention mechanisms used in transformer neural networks.
- Comparing representations of transformer neural networks and models of long-term memory in hippocampus.

Paninski Lab | Columbia Theoretical Neuro. Center

Aug 2019 - Dec 2019

- Rotation project adapting probabilistic graphical models to find latent states of behavior and decision making in mice.

Carmena Lab | Berkeley EECS Department

May 2018 - Aug 2019

- Ran brain-machine interfaces (BMI) experiments and analyzed data to investigate neuroprosthetic learning in motor cortex.
- Interpreted machine learning models by using Shapley values to understand how intrinsic properties of neurons affected how well these neurons could be used in BMI control.

Feldman Lab | Helen Wills Neuroscience Institute

Jan 2015 - May 2018

- Developed computational models of neurons in somatosensory cortex as a population of negative binomial processes modulated by sensory input timing.

Collins Lab | Berkeley Cognitive Science Department

June 2016 - Aug 2016

- Developed a behavioral application to test RL models of human decision making.

TEACHING

Lecturer, *Math Tools for Neuroscience* at Columbia University

Jan 2022 - May 2022

- Taught linear algebra for a course on fundamental math topics for PhD students in neuroscience.

TA, *Synthetic Biology* at UC Berkeley

Aug 2018 - Dec 2018

- Helped manage a hybrid online/in-person class between UC Berkeley & MIT and led discussion sections
- Topics: metabolic engineering, genome engineering, protein and RNA circuits, gene drives

TA, *Algorithms & Intractable Problems* at UC Berkeley

Aug 2017 - Dec 2017

- Developed new course project for 700+ students on approximate solutions to NP-hard problems.
- Led discussion sessions for 60+ students.
- Topics: asymptotics, graph theory, linear and dynamic programming, approximation algorithms

TA, *Data Structures* at UC Berkeley

Aug 2016 - Aug 2017

- Developed course materials and tests, helped manage 300+ student course, and ran discussion sessions.
- Topics: Java programming, data search structures, graph algorithms, etc.

MENTORING & OUTREACH

Columbia Access Neuroscience

Aug 2020 - present

- Helped organize diversity initiatives for underrepresented minorities on the undergraduate level

Zuckerman Institute Gender Inclusion (ZIGI) Group

June 2021 - present

- Helped organize a seminar series on topics related to gender inclusivity in science

Leadership Alliance Summer Research Mentor

June 2021 - Aug 2021

- Mentored an undergraduate student on a summer research project.

Columbia Neuroscience Outreach *Scientist on the Subway Writer*

Aug 2020 - Dec 2020

- Writer and editor of profile articles about the diverse stories of neuroscientists for non-science audiences.

SKILLS

Languages: Python, Java, Matlab**Miscellaneous:** Pytorch, Linux, Git, Arduino, Slurm, Jupyter, Matplotlib