

# CHING FANG

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## EDUCATION

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### 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

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**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

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

Vendrell-Llopis, N., **Fang, C.**, Qu, A., Costa, R., Carmena, J. [Diverse operant control of different motor cortex populations](#). (submitted to journal)

Vendrell-Llopis, N., **Fang, C.**, Qu, A., Kitano, M., Costa, R., Carmena, J. Isolating cell-type specific subpopulations of motor cortex neurons during neuroprosthetic learning. 48th Meeting of the Society for Neuroscience (SfN), 2019.

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

## RESEARCH EXPERIENCE

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### 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 ASSISTANTSHIPS

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**BioE 147/247: Synthetic Biology, 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

**CS 170: Algorithms & Intractable Problems, 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

**CS 61B: Data Structures, 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

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**Columbia Access Neuroscience**

Aug 2020 - present

- Helped organize diversity initiatives for underrepresented minorities on the undergraduate level
- Received a department internal award for service in diversity, equity, and inclusion

**Zuckerman Institute Gender Inclusion (ZIGI) Group**

June 2021 - present

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

**Leadership Alliance Mentor**

June 2021 - Aug 2021

- Mentored an undergraduate student on a summer research project.

**Scientist on the Subway**

Aug 2020 - Dec 2020

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

## SKILLS

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**Languages:** Python, Java, Matlab

**Miscellaneous:** Pytorch, Linux, Git, Arduino, Slurm, Jupyter, Matplotlib