

Naomi Donovan
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EDUCATION

University of California, San Francisco
Ph.D. Neuroscience in Dr. Reza Abbasi's lab

San Francisco, CA

Johns Hopkins University

B.S. in Neuroscience and minor in Applied Math & Statistics.

Baltimore, MD

May 2023

Graduated with Honors in Neuroscience, Overall GPA: 3.97/4.00, 5 semesters on Dean's List

RESEARCH EXPERIENCE

Graduate Student in Dr. Reza Abbasi-Asl's Lab

University of California, San Francisco

San Francisco, CA

June 2024 - Present

- Currently designing a method to model large populations of neural activity using a deep machine learning approach based on a transformer architecture.

Rotation in Dr. Reza Abbasi-Asl's Lab

University of California, San Francisco

San Francisco, CA

April 2024 – June 2024

- Collaborated with the Allen Institute on a project to functionally characterize the primary visual cortex of mice.
- Designed Python scripts to create a neural population decoding strategy to determine the visual stimulus at which a mouse was viewing based off primary visual cortex activity.

Rotation in Dr. Felice Dunn's Lab

University of California, San Francisco

San Francisco, CA

January 2024 – March 2024

- Investigating cone loss impact on noise correlations between direction-selective retinal ganglion cells in mice.
- Techniques include performing whole-cell and cell-attached paired patch clamp recordings, analyzing multielectrode array (MEA) with spike sorting algorithms, and developing an analysis framework in MATLAB to look at noise correlation between cells.

Rotation in Dr. Saul Kato's Lab

University of California, San Francisco

San Francisco, CA

September 2023 – December 2023

- Completed a project to examine the internal neural state of *C. elegans* using PCA to analyze how optogenetic activation of a single neuron perturbs a dynamic and stable manifold of neural activity.
- Techniques include whole-brain calcium imaging with optogenetic stimulation, analysis of calcium imaging data using Python, and software development.

Kanold Lab Research Assistant

Johns Hopkins School of Medicine

Baltimore, MD

May 2021 – May 2023

- Led a project to image tonotopic maps in the primary auditory cortex of mice via two-photon and widefield imaging. Learned how to handle mice, perform cranial window surgery, and conduct in-vivo calcium imaging.
- Utilized multiple hardware and software tools including Python, MATLAB, Fusion360, GitHub, Raspberry Pi, and Arduino.

Excellence in Research Intern

École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

May 2022 – August 2022

- Developed and tested a biologically accurate model of thalamic input to the rat barrel cortex as a research lab member for a joint project with the Lab of Sensory Processing (PI: Dr. Carl Petersen) and the Blue Brain Project.

- Created and implemented Python scripts to model thalamocortical inputs and interpret cortical output.

TEACHING EXPERIENCE

Neuroscience Teaching Assistant

University of California, San Francisco

San Francisco, CA

September 2024 – Present

- Teaching assistant for a neuroscience graduate-level course that covers basic cellular and molecular mechanisms in neuroscience.
- Led office hours once a week and graded problem sets.

Computational and Coding Neuroscience Lecture

University of California, San Francisco

San Francisco, CA

September 2024

- Volunteered to create and lead a lecture on coding and computational neuroscience introductory concepts for first-year neuroscience Ph.D. students at UCSF.
- Topics covered include single-neuron spiking models, biophysical-based neural models, spike sorting methods, dimensionality reduction techniques (PCA, UMAP), neural decoding paradigms, artificial neural networks (CNNs, RNNs, transformers). Also, included example Python scripts that go with covered topics.

Computational Neuroscience Teaching Assistant

Johns Hopkins University

Baltimore, MD

January 2023 – May 2023

- Class covered the basics of computational neuroscience, including spike train statistics and modeling, neural encoding / decoding, models of reinforcement learning, and connectomics. Modeling and code development using MATLAB.
- Held office hours, answered questions during in-class lectures, and graded tests and homework. Responsible for creating answer keys for homework and tests.

Introduction to Computing Teaching Assistant

Johns Hopkins University

Baltimore, MD

August 2020 – May 2021

- Class covered the basics of modern programming languages (UNIX, Python) and of a software package (MATLAB) for statistical analysis and simulation.
- Led Zoom breakout rooms, held office hours, and graded tests and homework.

MENTORSHIP EXPERIENCE

Reading Partners Mentor

Dolores Huerta Elementary School

Virtual, San Francisco / Bay Area

September 2024 – Present

- Trained to tutor elementary-age students in reading and literacy skills.
- Paired with a single student for an entire school year to guide them through established curriculum by teaching them during one-on-one sessions multiple times a week.

Alumni Mentor for Speed Networking Events

Johns Hopkins University

Virtual

September 2024 – Present

- Volunteered to mentor current undergraduates at Johns Hopkins once a month in speed networking events.
- Gave feedback on students' networking skills, elevator pitches, and gave interviewing tips.

Alumni Mentor for Life Design Summer Experience Practicum Course

Johns Hopkins University

Virtual

June 2024

- Volunteered to serve as a mentor in a professional development virtual course for approximately 300 summer scholarship recipients in research / internship roles across the country.
- Shared my professional and academic background with students in small groups as they practiced conducting networking conversations, and I provided feedback on conducting similar conversations in the future.

Learning Den Peer Tutor

Baltimore, MD

- Selected based upon high academic success. Specially trained (5+ hours) to become a personalized tutor.
- Tutored students each semester in a range of courses including Calculus I, Calculus II, Chemistry I

POSTER PRESENTATIONS

Babola TA, **Donovan N**, Darcy S, and Kanold PO. “Preventing progressive hearing loss in common transgenic mouse lines” Day of Undergraduate Research in Engineering, the Arts & Humanities, Medicine, and the Sciences (DREAMS) hosted by Johns Hopkins Office of Undergraduate Research (HOUR), April 2023

PAPERS

T.A. Babola*, **N. Donovan***, S.S. Darcy*, C.D. Spjut, and P.O. Kanold, “Limiting hearing loss in transgenic mouse models,” Oct. 03, 2024, *bioRxiv*. doi: [10.1101/2024.10.03.616327](https://doi.org/10.1101/2024.10.03.616327). *Shared first author.

A. Sherafati*, **N. Donovan***, R. Farhoodi, J. Larkin, K. Takasaki, C. King, D. Wyrick, J. Zhang, D. Millman, D. Denman, J. Lecoq, A. Arkhipov, N.W. Gouwens, J. Waters, R.C. Reid, S.E.J. Vries, M. Buice, R. Abbasi-Asl. “An open-source physiological survey of an entire column of the primary visual cortex” *In preparation*. *Shared first author.

- In this paper, we functionally characterize excitatory neurons in all layers of the primary visual cortex of mice. Members of the Allen Institute performed extensive two-photon and three-photon calcium imaging in four mice, and this data forms the largest calcium imaging dataset ever collected in mouse primary visual cortex. We calculate various response properties, including on/off receptive fields, lifetime sparseness, and stimuli decoding performance, and found depth-specific heterogeneities that are consistent across mice.
- My contributions to this paper include designing and running the stimuli decoding paradigm (thru Python) and writing/editing the paper.

EXTRACURRICULAR ACTIVITIES

Johns Hopkins University Track & Field / Cross Country

August 2019 – May 2023

- Dedicated 20+ hours per week to a regular, yearly schedule of practice, conditioning, and meets.
- Led a junior leadership council in Fall 2021 to organize team events, lead team workouts, and arrange communication between coaches and team members.

Johns Hopkins Student Athlete Advisory Committee (SAAC)

August 2019 – May 2021

- Directed communication between the track / cross country team and SAAC to organize spirit events.