

Mariana Harris

📍 Dept. of Computational Medicine. University of California, Los Angeles

✉ mharris94@g.ucla.edu 📞 (424)-248-4641

EDUCATION

University of California, Los Angeles

2019 – present

Ph.D. Biomathematics

Advisor: Nandita Garud

Instituto Tecnológico Autónomo de México (ITAM)

2014 – 2018

B.S. Applied Mathematics - Summa Cum Laude

Advisor: Víctor F. Breña Medina

Thesis: Mathematics Modeling of Quorum Sensing Dynamics

RESEARCH EXPERIENCE

University of California, Los Angeles

2019 – present

Ph.D. candidate

Prevalence of hard and soft sweeps in natural populations.

Advisor: Nandita Garud.

I use statistics, machine learning and computational population genomics to detect signatures of positive selection in genomic data. I have worked on quantifying the rapidity of adaptation by detecting selective sweeps and classifying them as either hard or soft with applications in *Drosophila* and ancient DNA.

Iowa State University

Summer 2017

Math NSF Research Experience for Undergraduates (REU)

A Limiting Strategy for Locally-Implicit Lax-Wendroff DG Methods.

Advisors: Dr. James A. Rossmann and Caleb Logemann.

Implemented method and applied positivity and slope limiters to solve nonlinear PDEs.

Harvard University

Summer 2016

Research Experience for Undergraduates (REU)

DNA Helix Bundle Self-Assembly.

Advisors: Dr. Michael Brenner, Hidenori Tanaka, Martin Falk

Developed a computational model of the process of self-assembly to provide experimentalists with a tool to obtain information on parameters involved in DNA self-assembly at the nanoscale level.

AWARDS

UCOP Dissertation Year Award (UCOP DY A)

2024-2025

<i>DeLill Nasser</i> Travel Award	Fall 2023
Best poster award QCBio Retreat 2023 UCLA	September 26, 2023
Outstanding mentorship award BIG summer 2022 UCLA	Summer 2022
NIH/UCLA Genomic Analysis Training Grant (T32)	2021-2023
Sotero Prieto Prize 2020, <i>honorary mention</i> <i>Awarded by the Mexican Mathematical Society to the most outstanding undergraduate thesis in Mathematics.</i>	2021
NIH Systems and Integrative Biology Training Grant (T32)	2019 - 2021

PUBLICATIONS

* denotes equal contribution.

Harris M., Kim B., and Garud N. Enrichment of hard sweeps on the X chromosome compared to autosomes in six *Drosophila* species (2024). *Genetics*. <https://doi.org/10.1093/genetics/iyac019>

Pandey D.*, **Harris M.***, Garud N. and Narasimhan V. Understanding natural selection in the European Holocene using multi-locus genotype identity scans (2023). *BioRxiv* <https://doi.org/10.1101/2023.04.24.538113>

Harris M. and Garud N. Enrichment of hard sweeps on the X chromosome in *Drosophila melanogaster* (2023). *Mol Biol Evol*. <https://doi.org/10.1093/molbev/msac268>

TEACHING AND MENTORING

TA, Molecular Evolution (EEB 121) **Fall 2023**
UCLA

Graduate research mentor **Summer 2022**
Bruin in Genomics (BIG) summer program UCLA

I was a mentor for the BIG summer research program at UCLA, a program that seeks to provide research experience in quantitative biology to undergraduate students.

Undergraduate Faculty of Mathematics **2017 - 2018**
Instituto Tecnológico Autónomo de México (ITAM)

The department of Mathematics selects junior and senior students of academic excellence to tutor and provided academic support for students struggling on any of the courses offered by the department of mathematics.

PRESENTATIONS

TAGC 2024 – talk **March 7, 2024**
Enrichment of hard sweeps on the X chromosome relative to

autosomes in six Drosophila species.

QCBio Retreat 2023 (UCLA) – poster

Enrichment of hard sweeps on the X chromosome relative to autosomes in six Drosophila species.

September 21, 2021

SCALE 2023 – talk

Enrichment of hard sweeps on the X chromosome relative to autosomes in six Drosophila species.

May 20, 2023

SMBE everywhere 2023 GS10 – talk

Enrichment of hard sweeps on the X chromosome relative to autosomes in six Drosophila species.

April 27, 2023

Drosophila 2023 – poster

Enrichment of hard sweeps on the X chromosome relative to autosomes in six Drosophila species.

March 2, 2023

PEQG 2022 – poster

Contrasting the Mode and Tempo of Adaptation on the X Chromosome and the Autosomes of D. melanogaster.

June 9, 2022

NHGRI Research Training and Career Development Annual Meeting (Duke) – poster

Contrasting the Mode and Tempo of Adaptation on the X Chromosome and the Autosomes of D. melanogaster.

April 4, 2022

QCBio Research seminar series (UCLA) – talk

Differences in the Signatures of Selection Between the Autosomes and the X Chromosome in D. melanogaster

November 10, 2021

QCBio Retreat 2021 (UCLA) – poster

Are Selective Sweeps on the X Chromosome Hard?

September 21, 2021

Instituto Tecnológico Autónomo de México (ITAM) Math Colloquium - talk

Mathematical Modeling of Quorum Sensing Dynamics

May 14, 2019

National Young Researchers in Mathematics Meeting at Universidad Mexicana Autónoma de México- poster

Positivity and Slope Limiters for Locally-Implicit Lax-Wendroff Discontinuous Galerkin Methods.

February 19-22, 2018

Joint Mathematics Meeting (JMM) 2018 – poster

Positivity and Slope Limiters for Locally-Implicit Lax-Wendroff Discontinuous Galerkin Methods.

January 12, 2018

International Linear Algebra Society (ILAS) 2017 Conference – poster

Positivity and Slope Limiters for Locally-Implicit Lax-Wendroff

July 24, 2017

Discontinuous Galerkin Methods.

OTHER PROFESIONAL ACTIVITIES

Reviewer for:

Molecular Ecology, Nature Ecology and Evolution, PLoS Genetics, Genetics

ORGANIZATIONS

Biological Sciences Council

UCLA

Computational medicine student representative.

September 2022 – present

**Justice, Equity, Diversity and Inclusion (JEDI) committee
for computational medicine.**

UCLA

Graduate Student Representative

September 2022 – present

Math student's Representation

Instituto Tecnológico Autónomo de México (ITAM)

Head of academic committee.

2016-2017

Laberinto & Infinitos

Instituto Tecnológico Autónomo de México (ITAM)

Mathematics Student's Journal editor.

January 2018 - October 2018

OUTREACH

UCLA Explore your Universe Science Fair

Science fair volunteer

October 2022

**San Bernardino, Inyo, and Mono Counties elementary
and middle school Science & Engineering Fair**

Science fair judge

2022, 2023

**How to apply to Summer Research Programs for
Undergraduates (talk)**

Instituto Tecnológico Autónomo de México (ITAM)

September 2017

**Applying to Summer Research Programs and Graduate
School in the US (talk)**

Instituto Tecnológico Autónomo de México (ITAM)

August 2019