

MANUEL PAEZ

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EDUCATION

Columbia University New York, NY
Master of Science, Computer Science, GPA: 4.0/4.0 Jan. 2025 - Expected May 2026
Graduate Coursework: Advanced Probability Theory, Computational Learning Theory, Probability II, Projects in CS,
Theoretical Foundations of LLMs.

Columbia University New York, NY
Bachelor of Arts, Computer Science and Mathematics Sept. 2023 - Expected May 2026
Bachelor of Arts, Computer Science Sept. 2019 - May 2023
Relevant Coursework: Advanced Algorithms, Advanced Topics in Deep Learning, Algorithms for Massive Data, Analysis
and Probability I, Honors Complex Variables, Machine Learning Theory, Natural Artificial Neural Networks, Real
Analysis I and II, Theoretical Neuroscience, Unsupervised Learning, Intro to Quantum Computing.

Research Experience

Neural Circuits and Algorithms Group, Flatiron Institute New York, NY
Visiting Researcher, Neural Circuits and Algorithms Group Nov. 2024 - Aug. 2025

- Developing novel algorithmic and diffusion theory for non-linear dynamical systems of neuronal circuitry.

Columbia University New York, NY
Course Assistant, Department of Computer Science Sept 2024 - Present

- Taught Recitations, held office hours and graded assignments for COMS 4995: Randomized Algorithms and COMS 6998: Algorithms for Massive Data.

Neural Circuits and Algorithms Group, Flatiron Institute New York, NY
Visiting Scholar Fellow, Neural Circuits and Algorithms Group Nov. 2024 - Aug. 2025

- Developing novel algorithmic and diffusion theory for non-linear dynamical systems of neuronal circuitry.
- Finished reengineering CaImAn, an open-source, large-scale calcium imaging data analysis tool away from Tensorflow using PyTorch and Keras.

Neural Circuits and Algorithms Group, Flatiron Institute New York, NY
Summer Research Intern, Neural Circuits and Algorithms Group May 2024 - Aug. 2024

- Redesigned CaImAn, an open-source, large-scale calcium imaging data analysis pipeline from Tensorflow using PyTorch and Keras.
- Reintegrated an automated and scalable analysis pipeline for voltage imaging datasets with a PyTorch backend.
- Utilized Flatiron Institute's HPC cluster to train, test, and execute PyTorch-implemented supervised machine learning models on 10+ TB calcium imaging datasets. Code predominantly in Python. Coordinated with Janelia scientists.

Columbia University, Department of Computer Science New York, NY
Researcher, supervised by Professor Alexandr Andoni Jan. 2024 - Present

- Investigating algorithmic constructions of high-dimensional Euclidean and Hamming spanners, using developed methods for efficient approximate near-neighbor search in Euclidean space and Locality Sensitive Hashing.
- Conducting research on low-distortion embeddings of Tree Bayesian Networks and Markov Random Fields into finite l_1 space.

Flatiron Institute - Simons Foundation

New York, NY

Research Intern, Neural Circuits and Algorithms Group

Sept. 2022 - Aug. 2023

- Implemented and trained a self-supervised machine learning model to improve a neuron-boundary segmentation model for assembled connectome maps from high-throughput electron microscopy using PyTorch and scikit-learn.
- Leveraged Flatiron Institute's HPC cluster and open-source tools such as Neuroglancer and Pytorch Connectomics to automate neuron-boundary segmentation pipeline processes. Code predominantly in Python.

Columbia University, Department of Physics

New York, NY

Undergraduate Researcher, supervised by Professor Szabolcs Márka

Oct. 2022 - May 2023

- Devised a Python program for a quantum-advantage pattern recognition algorithm primarily for blackhole collision search using Qiskit and Python.
- Developed methods to test the algorithm on gravitational-wave data that was publicly available. Collaborated with researchers at Heidelberg University to develop this algorithm.

Columbia University, Department of Psychiatry

New York, NY

Undergraduate Researcher, supervised by Professor Kiyohito Iigaya

April 2022 - Sept. 2022

- Investigated the geometry and representation of neural data from context-dependent tasks using Principal Component Analysis and other manifold techniques, and reconstructed the geometry of the neural data by using PyTorch, Tensorflow, and Keras to build modified Long Short Term Memory (LSTM) models.
- Collaborated with researchers from the University of Cambridge who collected the experimental data from monkeys.

PRESENTATIONS

- Simons Foundation Summer Intern Research Symposium, New York, New York, August 2024. Manuel Paez. "CaImAn Pytorch: Calcium Image Data Analysis Tool for Pytorch" (poster).
- Simons Foundation SURFiN Research Symposium, New York, New York, April 2023. Manuel Paez. "Self-supervised Neuron Boundary Inpainting to Fix Membrane Leaking in Electron Microscopy Images" (poster).

AWARDS

Dean's List	Summer 2021, Fall 2022, Spring 2024 - Spring 2025
ClimateScience Olympiad 2024, Semi-finalist	Aug. 2024
MIT IQuHACK Hackathon 2023; Covalent x IBM Challenge - 1st place	Jan. 2023
Simon Foundation Global Brain SURF Fellowship	Aug. 2022
United States International Young Physicist Tournament USIYPT) - 1st place	Feb. 2018 and Jan. 2019

LEADERSHIP EXPERIENCE

Columbia Undergraduate Quantum Computing Club (CUQCC)

Dec. 2022 - May 2023

Co-head and Co-founder

- Organized seminar talks and events featuring speakers from Columbia University and non-Columbia University affiliations, such as students, professors, and research scientists, to discuss quantum information sciences from various subfields.
- Led the hackathon team to 1st place at MIT IQuHACK 2023 IBM x Covalent Event Challenge. Project on Quantum Chaos Engineering for optimization of energy grids.

EXTRACURRICULAR EXPERIENCE

Markov Chain and Mixing Times Reading Group	May 2025 - Aug. 2025
Columbia Undergraduate Theoretical Computer Science Learning Seminar	Sept 2023 - Present
Undergraduate Math Society (UMS)	Sept. 2019 - Dec. 2024
Supervised Undergraduate Mathematics Reading Group - Combinatorics	Sept. 2023 - Dec. 2023

TECHNICAL SKILLS

Programming Languages: Python, C++, MATLAB, R, Java,

Technologies: Git, GSuite (Collab, Drive, Gmail, Drive, etc.), Keras, Jupyter Notebook, LaTeX, Linux, Microsoft Office (Excel, PowerPoint, Word), PyTorch, Qiskit, Slurm and HPC computing, scikit-learn, Tensorflow, Vim, VS Studio Code.

Natural Languages: English (Fluency), Spanish (Fluency), German (Professional Proficient), French (Elementary), Korean (Elementary)