Manuel Paez

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Education

Columbia University New York, NY
Master of Science, Computer Science Jan 2025 - Expected Dec 2025
Relevant Coursework: Optimization II, Theoretical Foundations of Large Language Models, Probability II.

Columbia University New York, NY
Bachelor of Arts, Computer Science with Mathematics Concentration, GPA 3.65/4.0 Sept 2019 - Dec 2024
Relevant Coursework: Algorithms for Massive Data, Advanced Topics in Deep Learning, Machine Learning Theory, Analysis and Probability I, Real Analysis I and II, Unsupervised Learning, Advanced Algorithms, Quantum Computing.

Work and Research Experience

Flatiron Institute - Simons Foundation New York, NY
Visiting Scholar Fellow, Neural Circuits and Algorithms Group Nov 2024 - Present
- Developing novel algorithmic theory for unsupervised clustering of neural data from non-linear dynamical systems.

Columbia University New York, NY
Course Assistant Sept 2024 - Sept 2024
- Taught recitations, held office hours, and graded assignments for Randomized Algorithms (COMS 4995).

Flatiron Institute - Simons Foundation New York, NY
Research Intern, Neural Circuits and Algorithms Group May 2024 - Aug 2024
- Redesigned a large-scale calcium imaging data analysis tool away 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 predominately in Python. Coordinated with Janelia scientists.

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 predominately in Python.

Awards

MIT IQuHACK Hackathon 2023; Covalent x IBM Challenge - 1st place Jan 2023
Simon Foundation Global Brain SURF Fellowship Aug 2022

Projects

Unsupervised Learning, "Uncovering User Information from Obfuscated K-Clustering" Oct 2024 - Dec 2024
- Initiated and Collaborated on a theoretical and Python-based framework for a data-inference attack on K-clustering.

Undergraduate Project in CS, "Quantum Algorithm for Detecting Gravitational Waves" Nov 2022 - May 2023
- Executed in Python an innovative quantum advantage pattern recognition method on LIGO gravitational-wave data.

Columbia Undergraduate Quantum Computing Club Nov 2022 - Jan 2023
- Co-founder and former co-head; led a Columbia University hackathon team to 1st place at MIT IQuHACK 2023 in the IBM x Covalent Challenge for a project on optimizing energy integrity with quantum chaos engineering.

Technical Skills

Languages and Frameworks: C/C++, Python, R, Java, MATLAB, Tensorflow, PyTorch, Keras, scikit-learn, OpenCV.