Manuel Paez

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EDUCATION

Columbia University, General Studies - New York, NY — September 2023 - Expected August 2024
Bachelor of Arts, Mathematics
Relevant Coursework: Algorithms for Massive Data, Introduction to Modern Algebra I, Introduction to Modern Analysis I, Honors Complex Variables

Columbia University, Columbia College - New York, NY — May 2023
Bachelor of Arts, Computer Science, Computer Science Track: Foundations
Relevant Coursework: Intro to Quantum Computing, Advanced Algorithms, Natural Artificial Neural Networks, Computational Linear Algebra, Discrete Mathematics, Artificial Intelligence, Undergraduate Research Project

Phillips Exeter Academy - Exeter, NH — June 2019
High School Diploma; Activities: Math Club, Physics Club, Computer Club, Puzzle Club

RESEARCH EXPERIENCE

Flatiron Institute, Center for Computational Neuroscience — September 2022 - Present
Research Intern for Neural Circuit and Algorithms Group, Advisors: Mitya Chklovskii, Jingpeng Wu
Devised and implemented a self-supervised neuron-boundary augmentation tool for membrane inpainting of electron microscopy images of a wasp's brain. Developed project goals and methods to improve the self-supervised model, such as rotation of random 3D image patches and using human-corrected segmentation mappings as training data. Collaborated with fellow researchers within the Flatiron Institute to improve methods to train models.

Columbia University, Department of Physics — October 2022 - Present
Undergraduate Research Assistant, Advisors: Szabolcs Márka
Constructed and programmed 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 for the development of this algorithm.

Columbia University, Department of Psychiatry — April 2022 - September 2022
Undergraduate Research Assistant, Advisors: Kiyohito Iigaya
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 SURF Research Symposium, New York, New York, April 2023. Manuel Paez. "Self-supervised Neuron Boundary Inpainting to Fix Membrane Leaking in Electron Microscopy Images" (poster).

LEADERSHIP AND SERVICE EXPERIENCE

Scientific Mentorship Institute (Sci-Mi) May 2022 - August 2022

Mentor; Facilitated and guided high school students in computer science and neuroscience projects over the course of a summer to be present in local and regional science fairs

Columbia Undergraduate Quantum Computing Club (CUQCC) December 2022 - Present

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. Curated food and drink choices for every meeting.

MEMBERSHIP

Undergraduate Math Society (UMS) September 2019 - Present

AWARDS

United States International Young Physicist Tournament USIYPT) - 1st place February 2018 and January 2019
MIT IQuHACK 2023; Covalent x IBM Challenge - 1st place January 2023
Simon Foundation Global Brain SURF Fellowship September 2022
Dean's List Summer 2021, Fall 2022

SKILLS AND INTEREST

Computational: Java, Python, MATLAB, R, C/C++, Git, Jupyter Notebook, LaTeX, Microsoft Office (Excel, Word, PowerPoint), GSuite(Gmail, Drive, Collab, etc.), Linux, VS Studio Code, Tensorflow, Vim, Cirq, PyTorch, Qiskit, Neuroglancer

Natural Languages:
English (Fluent), Spanish (Fluent), German (Fluent), French (Intermediate), Korean (Intermediate)