



ABISHRANT PANDAY

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EDUCATION

HARVARD UNIVERSITY
Cambridge, MA
May 2022

A.B. IN MATHEMATICS, M.A. IN COMPUTER SCIENCE GPA: 3.9/4.0

Relevant Coursework Math 55A: Honors Linear and Abstract Algebra, Math 55B: Honors Real and Complex Analysis, Math 231A: Graduate Algebraic Topology, CS 223: Probabilistic Analysis and Algorithms, CS 226R: Algorithmic Fairness and Differential Privacy, CS 229R: Error Correcting Codes, CS 234R: Computation in Networks and Crowds, CS 238: Optimized Democracy, CS 281: Advanced Machine Learning, CS 227: Cryptography

Projects CS 238: [GAErryChain](#), [Improving MCMC Random Walk Sampling With GAEs](#), CS 234: [Network Diffusion With Conflicting Parties](#), CS 281: [Neural Machine Translation and Multi-Agent Networks for Protein Structure Prediction](#), CS 223: [Iterative Skyline Computation Through Noisy Comparisons](#), CS 226R: [Algorithmic Fairness in Post-Processed Toxicity Text Classification](#), APCOMP 275: [Characterization of Cs\(Pb/Ti\)X₃ Perovskites](#), Econ 2099: [Economic Inefficiencies in Prison Labor Programs](#)

Organizations HackHarvard, Harvard-MIT Math Tournament, Harvard Computer Society, Harvard Asian American Dance Troupe, Harvard Radio (WHRB), Student Astronomers at Harvard-Radcliffe (STAHr)

HUNTER COLLEGE HS
New York, NY
Jun 2018

GPA: 4.0/4.0 SAT: 800 MATH, 800 READING, 22/24 WRITING

Relevant Coursework Calculus III with Analytic Geometry, Vector Analysis, Linear Algebra, Differential Equations, AP BC Calculus, AP Chemistry, AP Physics C: Mechanics & Electricity and Magnetism, AP Computer Science A, AP Micro/Macro Economics, Organic Chemistry

Organizations Science Olympiad, The Leading Strand, Science Bowl, Math Team, The Observer, I-Help Liberia

Awards High School National Championships Tournament (1st Place), Scholastic Art & Writing Awards (National Silver Medal, 5x Regional Gold), 2017 Siemens Competition Semifinalist, NYC Science & Engineering Fair (2nd Place in CS), Moody's Mega Math Challenge (Top 78/1121 Papers)

EXPERIENCE

AKUNA CAPITAL
Chicago, IL
Aug 2022 - Present

QUANTITATIVE TRADER

CELSIUS
New York, NY
Nov 2021 - Apr 2022

DEFI RESEARCHER

- Research into DeFi protocols and creation of smart contract protocols in Solidity
- Implementation of cross-chain bridging protocols between Ethereum and Polygon

ALLIANCEBERNSTEIN
Seattle, WA
May 2020 - Aug 2020

QUANT RESEARCH INTERN

- Created models to predict intraday trading volume and historical institutional volume. Built real-time algorithms to determine retail-traded stocks through social media analysis and incorporated into trading platform. Worked primarily in Python, C#, MySQL, kdb+

AXON
Seattle, WA
May 2020 - Aug 2020

SOFTWARE ENGINEER INTERN IN REAL TIME COMMUNICATIONS TEAM

- Built the backend framework for Admin and Integrations for AXON's Evidence line of products in order to enable effective communication, data processing, and handling for police and emergency responders
- Applied techniques from algorithmic design to improve performance and scalability. Worked primarily in Java, Ruby, MySQL

HARVARD UNIVERSITY
Jan 2019 - May 2022

MACHINE LEARNING AND QUANTUM OPTICS INTERN

- Laboratory of Dr. Marko Loncar. Applied machine learning and inverse design principles towards improving waveguide design for silicon vacancy (SiV) centers in diamond nanocavities, which are used to develop multi-node quantum networks

RESEARCH

GAERRYCHAIN: IMPROVING MCMC RANDOM WALK SAMPLING WITH GAES [2021]

- Improved on Markov Chain Monte Carlo sampling algorithms for gerrymandering detection by employing a graph auto-encoder architecture.
- Showed significant computational improvements as well as the ability to generate semi-contiguous districts.

NETWORK DIFFUSION WITH CONFLICTING PARTIES [2021]

- Created and implemented a model for network propagation in the presence of two parties and explored its dynamics, including optimal seeding strategies and budget constraints.
- Determined the effectiveness of several heuristics on the Facebook ego graph dataset.

ALGORITHMIC FAIRNESS IN POST-PROCESSED TOXICITY TEST CLASSIFICATION [2020]

- Studied the effect of the switching stochastic gradient descent (SSGD) algorithm on the Jigsaw Unintended Bias in Toxicity Classification dataset.
- Constructed similarity and distance metrics and showed their effectiveness in determining individual fairness. Demonstrated the effectiveness of using the post-processing SSGD algorithm proposed in literature to enforce a proxy for individual and group fairness on the task of text classification with sensitive labels.

NEURAL TRANSLATION AND EVOLUTIONARY MULTI-AGENT NETWORKS FOR *AB INITIO* PROTEIN STRUCTURE PREDICTION [2019]

- Developed new computational approaches for the protein structure prediction (PSP) problem based on neural machine translation and multi-agent evolutionary algorithms on cubic lattices. Approaches developed using amino acid residue and structure information from the Protein Data Bank and ProteinNet12 databases.
- Created ProteinSearch, which builds on RNNsearch and uses bidirectional encoding, decoding to model inter-residue dependence within secondary structure conformation
- Created MultiFold, a multi-agent evolutionary algorithm, which determines spatial protein conformations with lowest global energy.

All relevant papers can be found on my [website](#) and code for these and other personal projects is hosted on [GitHub](#).

SKILLS

LANGUAGES Python, Solidity, Java, C++, Ruby/Rails | HTML5, CSS, Bootstrap | TensorFlow, PyTorch | MATLAB, Quantum Espresso
SKILLS Machine Learning, Mathematical Modeling, Algorithm Design, Backend Infrastructure Design