

Princewill Okoroafor

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OBJECTIVE

My research interests are in machine learning theory, algorithmic game theory, reinforcement learning

EDUCATION

- **Cornell University** Ithaca, NY
Ph.D. Student, Computer Science. Advised by Robert Kleinberg *Sep. 2020 – Present*
- **Harvey Mudd College** Claremont, CA
Bachelor of Science in Computer Science and Mathematics; Concentration in French *Aug. 2016 – May. 2020*

RESEARCH EXPERIENCE

- Cornell University** Claremont, CA
Research with Robert Kleinberg and Wen Sun, Cornell CS Department *Sep 2020 - Present*
- **Calibration in online prediction setting:** We study the online binary prediction setting where a forecaster predicts the probability that a bit is 1 before the bit is revealed. The forecaster is called well-calibrated if for each predicted probability value p , among the n_p bits for which the forecaster predicts probability p , the actual number of ones, m_p , is indeed equal to pn_p . We investigate techniques for improving upper and lower bound results on the calibration error incurred the forecaster
 - **Bandits and Reinforcement Learning:** We revisit the linear bandit setting, investigating whether lower bound constructions in this setting apply to argmax functions that have small lipschitz constants in an attempt to resolve the extra factor of \sqrt{d} in Linear MDPs.
- Harvey Mudd College** Claremont, CA
Research experiences at Harvey Mudd with Math, CS and Physics Departments *Sep 2019 - May 2020*
- **Spam Message Clustering - Proofpoint:** Leveraged clustering techniques to perform distance metric learning in order to identify spam campaigns. Designed algorithms for embedding spam messages that extended landmark multidimensional scaling (LMDS) while still preserving geodesic distances. Implemented a framework that efficiently identifies and retrieves similar spam messages from large datasets using Facebook AI Similarity Search Engine (FAISS). Harvey Mudd Clinic Program - advised by Prof. Weiqing Gu, Harvey Mudd Math Department
 - **Algorithmic techniques in Computational Biology:** Researched the problem of reconciling pairs of evolutionary trees such as gene trees and species trees and pairs of species trees (e.g., parasites and hosts). Advised by Prof. Ran Libeskind-Hadas, Harvey Mudd CS Department
 - **Complexity of product preparations:** Researched the circuit complexity of preparing multiple copies of a known quantum state using a given gate set. Used stabilizer formalism and techniques for parallelization of bounded depth quantum circuits to derive results on the circuit complexity of preparing multiple copies of a known quantum state using a Clifford gate set. Advised by Prof. Theresa Lynn, Harvey Mudd Physics Department

INDUSTRY EXPERIENCE

- Microsoft Research** Bellevue, WA
Research Intern - advised by Akshay Krishnamurthy *Summer 2020*
- Developed a codebase for implementing new reinforcement learning algorithms. Designed an API to support benchmarking and testing multiple RL algorithms in different environments.
- Microsoft** Bellevue, WA
Software Engineer Intern *Summer 2018, Summer 2019*
- **Summer 2018:** Successfully implemented the user interface and business logic for read receipts feature in one-on-one chats on Microsoft Teams, a platform for workplace chat, meetings, notes, and attachments using Typescript and AngularJS. Implemented the business logic for group chats in addition as a stretch goal.

- **Summer 2019:** Successfully implemented the raise hand feature for calls and meetings on the new version of Microsoft Teams based on ReactJS. Later implemented this feature on AngularJS for backward compatibility

Jobs in Nigeria

Lagos, Nigeria

Software Developer Intern

Summer 2014

- Implemented a web crawler that parses data (specifically job listings) from a webpage into a database using Scrapy, a fast and powerful Python web crawling framework. This crawler helped *Jobs in Nigeria*, a growing startup in Nigeria akin to Hired, bridge the job search gap between job seekers and the corporations looking to employ them

TEACHING EXPERIENCE

Young Data Scientists League

US

Curriculum Developer

Jan 2018 - May 2020

- The Young Data Scientists League (YDSL) is non-profit community of students, educators, data scientists, and academic researchers in data science. Our mission is to provide every student with the pathways and motivation to use data to shape our world in diverse, creative, and ethical ways. More at <https://www.youngdatascientists.org/>

Harvey Mudd College

Claremont, CA

Tutor and Grader

Jan 2018 - May 2020

- Offered 2-4 hour long weekly office hours and graded problem sets for 15-25 students in the following classes: Abstract Algebra II: Representation Theory, Algorithms, Computability & Logic, Abstract Algebra, Discrete Math, Classical Mechanics & Wave Motion

Special Maths Academy Limited Nigeria

Abuja, Nigeria

Co-founder

January 2020 -

- Helped develop a summer camp designed for secondary school students who are passionate about building their mathematical foundation to be able to participate and ace the Nigerian mathematics olympiad. Our mission at SMAL is to build a sustainable ecosystem for the young talented Nigerian mathematicians; to mentor and nurture them from an early stage.

Gear Up

Renton, WA

Teaching Assistant

August 2019

- Curated content for and taught at STEM summer school for middle school students in Renton as a volunteer for the Washington Student Math Association
- Gear Up is a national program focused on increasing the college and career readiness of low-income students.

MISE CS Research Camp

Accra, Ghana

Teaching Assistant

Summer 2017

- MISE is a summer camp that offers excellent high school students opportunities to work on research projects led by graduate and post-doctoral mentors.
- Worked with *Amy Zhang*, Facebook AI Research Engineer to prepare and present lectures on Computational Thinking using Python to equip students with tools needed to build machine learning models using Python libraries.

Gifted Math Camp

Abuja, Nigeria

Instructor

Summer 2015, Summer 2017

- Mentored and taught at this high school math camp for exceptional students across Nigeria.

RELEVANT COURSEWORK

- **Computer Science:** Data Structures & Program Development, Computability & Logic, Programming Practicum, Algorithms, Neural Networks, Computational Complexity, Programming Languages, Advanced Algorithms, Machine Learning: Information Theory & Search, Reinforcement Learning
- **Math:** Combinatorics, Graph Theory, Abstract Algebra, Abstract Algebra II: Representation Theory
- **Physics:** Mechanics, Electricity & Magnetism, Quantum Physics, Quantum Mechanics, Quantum Information

PROGRAMMING SKILLS

- **Languages:** Python, Javascript, C++, Racket, HTML/CSS **Technologies:** Git, React, AngularJS, NodeJs

AWARDS

- **Dean's List:** Spring 2017, Spring 2018, Fall 2018, Spring 2019
- **2020 ACM ICPC North America Championship:** Competed at the first ever ACM North America Championship against 59 other top performing programming teams across North America
- **2019 ACM ICPC Southern California Regional Contest:** Placed 5th (representing Harvey Mudd College) out of 90 participating teams. One of 5 teams chosen to represent Southern California at the North America Championship
- **2017 Putnam Math Competition:** Exam Score: 19
- **Shamit Grover '05 and Kara McManus Scholarship:** A \$10,000 scholarship granted to talented International students at Harvey Mudd College
- **Silver Medal:** Pan African Mathematics Olympiad, 2015
- **Honorable Mention:** International Mathematics Olympiad, Argentina 2012. Also participated in 2014 and 2015

PROJECTS & HACKATHONS

- **hyperschedule (contributor):** A web application for scheduling courses quickly; used across the Claremont Colleges
- **freefood:** A web app where students can share and learn about free food events across campus
- **Sticky Messenger:** An extension of Windows Sticky Note app with social media and email integration
- **Hackathons Attended:** MHacks 2015, MuddHacks 2016, 5C Hackathon 2016, TreeHacks 2018, HackMIT 2018