

# Princewill Okoroafor

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**Email:** pco9@cornell.edu

**Website:** [pokoroafor.github.io](https://pokoroafor.github.io)

**Research interests** Theoretical Computer Science, Learning Theory, Algorithmic Game Theory

**Education**

**Cornell University** Ithaca, NY  
PhD in Computer Science August 2020 – Present  
Advisor: Robert Kleinberg.

**Harvey Mudd College** Claremont, CA  
BS in Computer Science and Mathematics August 2016 – May 2020  
Mentors: Ran Libeskind (CS), Mohamed Omar (Math)

**Honors and scholarships**

LinkedIn-Cornell 2023 Grant Recipient (accepted)	2023
JP Morgan Fellowship Award Recipient (declined)	2023
Computer Science Department Honors (Harvey Mudd)	2020
ACM ICPC Southern California Regional (5th Place)	2019
Shamit Grover '05 and Kara McManus Scholarship (Harvey Mudd)	2016
Pan-African Science Olympiad (Gold Medal)	2015
International Math Olympiad (Honorable Mention)	2012

**Publications**

**Omnipredictors for regression and the approximate rank of convex functions**  
Parikshit Gopalan, Princewill Okoroafor, Prasad Raghavendra, Abhishek Shetty, Mihir Singhal.  
*pre-print, 2024.*

**On the Vulnerability of Fairness Constrained Learning in Malicious Noise**  
Avrim Blum, Princewill Okoroafor, Aadirupa Saha, Kevin Stangl.  
*AISTATS 2024.*

**Non-stochastic CDF Estimation Using Threshold Queries**  
Princewill Okoroafor, Vaishnavi Gupta, Robert Kleinberg, Eleanor Goh.  
*SODA 2023.*

**Faster Recalibration of an Online Predictor via Approachability**  
Princewill Okoroafor, Wen Sun, Robert Kleinberg.  
*AISTATS 2024.*

**Research experience**

**Fair ERM in the Malicious Adversary Model**  
Mentors: Avrim Blum (TTIC) Summer 2022

We study the impact of adversarial data corruptions on the accuracy of fair learning algorithms and propose robustness modifications.

### **Online CDF Estimation**

Mentors: Robert Kleinberg (Cornell) 2021 – Present

Designed sample-efficient algorithms for estimating the empirical distribution of a sequence of non-stochastic samples using threshold queries.

### **Calibrated Forecasting in Online Learning**

Mentors: Robert Kleinberg (Cornell), Wen Sun (Cornell) Sep 2020 – Present

Worked on improving worst-case guarantees on the calibration error in online prediction. Proposed technique based on Blackwell's Approachability Theorem for achieving calibration and no-regret simultaneously.

## Teaching experience

**Teaching assistant, Cornell University** 2021 - 2022

CS 6789: Foundations of Reinforcement Learning

CS 4820: Introduction to Analysis of Algorithms

**Teaching assistant, Harvey Mudd College** Fall 2017 - Spring 2020

MATH 055: Discrete Mathematics

MATH 171: Abstract Algebra

MATH 172: Abstract Algebra II: Representation Theory

CS 81: Computability and Logic

CS 140: Algorithms

CS 181D: Complexity Theory

PHYS 24: Mechanics and Wave Motion

## Industry experience

**Google**, Learning Theory Berlin

Student Researcher Winter 2023

**Apple**, Machine Learning Research Cupertino, CA

Research Intern Summer 2023

**Microsoft Research**, MSR NYC Virtual

Research Intern - advised by Akshay Krishnamurthy Summer 2020

Developed a codebase for implementing new reinforcement learning algorithms with support for benchmarking and testing multiple RL algorithms in different environments.

**Microsoft**, Microsoft Teams Bellevue, WA

Software Engineer Intern Summer 2018, Summer 2019

Successfully implemented the user interface and business logic for read receipts feature in one-on-one chats on Microsoft Teams. Implemented the business logic for group chats in addition as a stretch goal.

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 Python web crawling framework.

**Talks and tutorials** **Non-stochastic CDF Estimation Using Threshold Queries** Oct 2023  
2023 INFORMS Annual Meeting

**Non-stochastic CDF Estimation Using Threshold Queries** Nov 2022  
Cornell Fall 2022 Theory Seminar

**Skills**  
**Programming**  
Proficient in: Python, Javascript, C++, HTML/CSS, Git  
Familiar with: Racket, React, AngularJS, NodeJS

**Languages**  
English (fluent), Igbo (fluent), French (conversational)

**Service and outreach** **Young Data Scientists League** Jan 2018 – present  
Content Developer. The Young Data Scientists League (YDSL) is a 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>

**Special Maths Academy Nigeria** Jan 2020 – present  
Helped develop a summer camp designed for secondary school students who are passionate about building their mathematical foundation to be able to successfully participate in 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** Aug 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**

Summer 2017

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. MISE is a summer camp that offers excellent high school students opportunities to work on research projects led by graduate and post-doctoral mentors.

**Gifted Math Camp - Abuja, Nigeria**

Summer 2015, Summer 2017

Taught and mentored at high school math camp for exceptional students from across Nigeria.

Other interests

soccer, chess.