

Krish Singal

ksingal@seas.upenn.edu | krishsingal.github.io | linkedin.com/in/krishsingal/

EDUCATION

University of Pennsylvania

Philadelphia, PA

Ph.D. in Computer Science (Advised by Sanjeev Khanna and Erik Waingarten)

2024 - 2029

Research: Sublinear Algorithms for problems in machine learning and high-dimensional geometry

Graduate Coursework Randomized Algorithms, Machine Learning Theory, Convex Optimization, Zero Knowledge Proofs, Algorithms for Massive Data

Columbia University

New York, NY

B.S. in Computer Science

2024

GPA: 4.02/4.0 (*Magna Cum Laude*)

Selected CS Coursework Randomized Algorithms, Advanced Algorithms, Machine Learning Theory, Computational Complexity, Algorithms for Massive Data, Quantum Computing, Operating Systems, Distributed Systems

Selected Math Coursework Real Analysis, Abstract Algebra, Probability Theory, Topology

Skills Python, Java, C++, C, Go, Latex

SELECTED WORK EXPERIENCE

Software Engineering Intern

2022

Apple (CoreMotion)

Cupertino, CA

- Developed memory efficient machine learning models for human gesture detection

Software Engineering Intern

2021

Amazon Web Services (Config)

Seattle, WA

- Built multi-tenant library to track and process real-time resource management metrics

Teaching Assistant

2022-Present

Columbia University

New York, NY

- Advanced Algorithms (Spring 2024), Computational Complexity (Fall 2023), Analysis of Algorithms (Fall 2022 + Spring 2023)

University of Pennsylvania

Philadelphia, PA

- Algorithms for Massive Data (Fall 2025)

RESEARCH (Authors are ordered alphabetically by last name unless otherwise noted (*))

Theoretical Computer Science

- Separating Single Linkage Clustering from Minimum Spanning Tree in High-Dimensional ℓ_1/ℓ_2
Alexandr Andoni, *Krish Singal*. In Submission.
- A Polynomial Space Lower Bound for Diameter Estimation in Dynamic Streams
Sanjeev Khanna, Ashwin Padaki, *Krish Singal*, Erik Waingarten.
Foundations of Computer Science (FOCS) 2025

Combinatorics

- On the Size and Complexity of Scrambles
Seamus Connor, Steven DiSilvio, Sasha Kononova, Ralph Morrison, *Krish Singal*. In Submission.

- **The Gonality of Chess Graphs**
Nila Cibu, Kexin Ding, Seamus Connor, Steven DiSilvio, Sasha Kononova, Chan Lee, Ralph, Morrison, *Krish Singal*. In Submission.
- **Chip-Firing Games on Banana Trees**
Marchelle Beougher, Nila Cibu, Kexin Ding, Seamus Connor, Steven DiSilvio, Kristin Heyse, Sasha Kononova, Chan Lee, Ralph Morrison, *Krish Singal*. In Submission.

Systems/Security

- ***MC*²: Rigorous and Efficient Directed Greybox Fuzzing***
Abhishek Shah, Dondgong She, Samanway Sadhu, *Krish Singal*, Peter Coffman, Suman Jana.
ACM Conference on Computer and Communications Security (CCS) 2022. HM Best Paper Award.

SELECTED PROJECTS

Chip Firing Interface 2023
SMALL REU *Williamstown, MA*

- Devised and implemented fast algorithms to simulate chip firing games and compute gonality on finite graphs

TALKS

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- (Upcoming) A Polynomial Space Lower Bound for Diameter Estimation in Dynamic Streams (FOCS 2025, UPenn Theory Seminar)
 - On the Size and Complexity of Scrambles (Joint Mathematics Meetings 2024, Young Mathematician's Conference 2023)

SERVICE

Mentor 2023
Columbia Undergraduate Learning Seminar in Theoretical Computer Science *New York, NY*

- Organized and taught seminar on boolean function analysis for undergraduate students

SELECTED HONORS

Jonathan M. Smith Fellowship Awardee 2025
 NSF Graduate Research Fellowship Program Honorable Mention 2024
 Tau Beta Pi Inductee 2024