

# Ashwin Padaki

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## SUMMARY

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Computer Science Ph.D. student specializing in fast algorithms for similarity search, clustering, and other high-dimensional problems, with an emphasis on approaches that are theoretically grounded and scalable.

## EDUCATION

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### University of Pennsylvania

*Ph.D in Computer and Information Science*

Philadelphia, PA

2024 – 2029 (expected)

Advised by Sanjeev Khanna and Erik Waingarten.

### Columbia University

*B.A. in Computer Science, Mathematics*

New York, NY

2020 – 2024

**GPA:** 4.06/4

## PUBLICATIONS

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Unless otherwise specified (\*), authors are ordered alphabetically by last name.

1. (\*) Tian Zhang, **Ashwin Padaki**, Jiaming Liang, Zack Ives, Erik Waingarten. Prune, Don't Rebuild: Efficiently Tuning  $\alpha$ -Reachable Graphs for Nearest Neighbor Search. (in submission)
2. **Ashwin Padaki**, Styopa Zharkov. Provably Fast Density-Based Clustering in High Dimensions. (in submission)
3. Sanjeev Khanna, **Ashwin Padaki**, Erik Waingarten. Sparse Navigable Graphs for Nearest Neighbor Search: Algorithms and Hardness. SODA 2026
4. Sanjeev Khanna, **Ashwin Padaki**, Krish Singal, Erik Waingarten. A Polynomial Space Lower Bound for Diameter Estimation in Dynamic Streams. FOCS 2025
5. Henry Fleischmann, Kyrylo Karlov, Karthik C. S., **Ashwin Padaki**, Styopa Zharkov. Inapproximability of Maximum Diameter Clustering for Few Clusters. SODA 2025
6. Josh Alman, Yunfeng Guan, **Ashwin Padaki**. Smaller Low-Depth Circuits for Kronecker Powers. SODA 2023

## IMPLEMENTATION EXPERIENCE

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### Open-Source Implementations

*Python (NumPy, PyTorch), C++, C*

- Locality sensitive hashing-based DBSCAN with a fully subquadratic-time guarantee. [dbscan](#)
- Data-driven spectral partitioning for nearest neighbor search (in progress). [data-driven-nns](#)
- Piecewise orthogonal transformation to align embeddings produced by different models. [procrustes-embed](#)

## SELECTED WORK EXPERIENCE

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**Head Teaching Assistant** Aug 2025 – present  
*University of Pennsylvania Philadelphia, PA*

- Algorithms for Big Data (Spring 2026, Fall 2025).

**Teaching Assistant** Sep 2022 – Dec 2023  
*Columbia University New York, NY*

- Cryptography (Fall 2023), Computational Complexity (Spring 2023), Real Analysis (Fall 2022).

**Quantitative Trader Intern** Jun 2022 – Aug 2022  
*Optiver Chicago, IL*

## TALKS

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### 1. Sparse Navigable Graphs for Nearest Neighbor Search

- SODA 2026 Conference Jan 2026
- NYC Graduate Student Theory Seminar Nov 2025
- DIMACS/Rutgers Theory Seminar Nov 2025
- CMU Theory Seminar Sep 2025

### 2. Inapproximability of Maximum Diameter Clustering for Few Clusters

- SODA 2025 Conference Jan 2025

## SERVICE

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**Seminar Organizer** Sep 2025 – present  
*UPenn Theory Seminar Philadelphia, PA*

**Seminar Instructor** Sep 2023 – Dec 2023  
*Columbia Undergraduate Learning Seminar in Theoretical Computer Science New York, NY*

## ACHIEVEMENTS

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**National Science Foundation (NSF) Graduate Research Fellow** 2024

**Phi Beta Kappa Inductee** 2024

**Putnam Mathematical Competition, Top 500 Scorer** 2022