

VIHAN SHAH

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PROFESSIONAL EXPERIENCE

University of Birmingham

Sep 2025 - Present

Postdoctoral Researcher

School of Computer Science

Host: Sagnik Mukhopadhyay

EDUCATION

University of Waterloo

Sep 2023 - Sep 2025

PhD in Computer Science

Cheriton School of Computer Science

Advisor: Sepehr Assadi

Thesis: “Optimal Graph Streaming Algorithms
and Further Advances in Modern Models of Computation”

Rutgers University

Sep 2020 - Sep 2023

PhD in Computer Science (Master’s degree earned en route)

Transferred to University of Waterloo

New Brunswick College of Arts and Sciences

Advisor: Sepehr Assadi

Rutgers University

Sep 2019 - May 2020

BA in Computer Science

Camden College of Arts and Sciences

Mahindra Ecole Centrale

Aug 2016 - May 2019

Completed 3 years of B.Tech in Computer Science

RESEARCH INTERESTS

My research lies in **theoretical computer science**, where I mainly study **graph problems** through the lens of **modern models of computation**. My work primarily focuses on **streaming algorithms**, while also extending to sublinear-time, dynamic, and learning-augmented models. I am motivated by challenges posed by massive datasets, and I enjoy uncovering the fundamental trade-offs between computational resources such as space, time, and approximation in these modern models of computation.

CONFERENCE PAPERS

Sublinear-Time Lower Bounds for Approximating Matching Size using Non-Adaptive Queries

SODA 2026

(solo-authored student work)

An Improved Fully Dynamic Algorithm for Counting 4-Cycles in General Graphs using Fast Matrix Multiplication

PODS 2025

with Sepehr Assadi.

Fully Dynamic Adversarially Robust Correlation Clustering in Polylogarithmic Update Time with Vladimir Braverman, Prathamesh Dharangutte, Shreyas Pai and Chen Wang.	<i>AISTATS 2025</i>
Space Complexity of Minimum Cut Problems in Single-Pass Streams with Matthew Ding, Alexandro Garces, Jason Li, Honghao Lin, Jelani Nelson, and David Woodruff.	<i>ITCS 2025</i>
Learning-augmented Maximum Independent Set with Vladimir Braverman, Prathamesh Dharangutte and Chen Wang.	<i>APPROX 2024</i>
New Lower Bounds in Merlin-Arthur Communication and Graph Streaming Verification with Prantar Ghosh	<i>ITCS 2024</i>
Streaming Algorithms and Lower Bounds for Estimating Correlation Clustering Cost with Sepehr Assadi and Chen Wang	<i>NeurIPS 2023</i>
Tight Bounds for Vertex Connectivity in Dynamic Streams with Sepehr Assadi	<i>SOSA 2023</i>
Generalizing Greenwald-Khanna Streaming Quantile Summaries for Weighted Inputs with Sepehr Assadi, Nirmal Joshi and Milind Prabhu	<i>ICDT 2023</i>
Space Optimal Vertex Cover in Dynamic Streams with Kheeran K. Naidu (student-only paper)	<i>APPROX 2022</i>
An Asymptotically Optimal Algorithm for Maximum Matching in Dynamic Streams with Sepehr Assadi	<i>ITCS 2022</i>

HONORS AND AWARDS

NeurIPS Scholar Award	<i>Oct 2023</i>
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TALKS

University of Warwick , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Feb 2026</i>
University of Liverpool , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Jan 2026</i>
Tata Institute of Fundamental Research , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Dec 2025</i>

University of Bristol , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Nov 2025</i>
University of Waterloo , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Oct 2025</i>
York University , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Oct 2025</i>
University of Toronto , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>Oct 2025</i>
University of Waterloo , Seminar Talk “An Improved Fully Dynamic Algorithm for Counting 4-Cycles in General Graphs”	<i>Jun 2025</i>
Toyota Technological Institute at Chicago , Invited Seminar Talk Young Researcher Seminar Series “Space Complexity of Minimum Cut Problems in Single-Pass Streams”	<i>Apr 2025</i>
University of Waterloo , Seminar Talk “Space Complexity of Minimum Cut Problems in Single-Pass Streams”	<i>Mar 2025</i>
Dartmouth College , Invited Seminar Talk “Space Complexity of Minimum Cut Problems in Single-Pass Streams”	<i>Jan 2025</i>
Rutgers University , Invited Talk, Reading Group “Learning-augmented Maximum Independent Set”	<i>Jun 2024</i>

In addition, I have presented several of my papers at conferences.

EXTERNAL REVIEWER

Symposium on Theory of Computing (STOC)	<i>2022, 2024, 2025</i>
Symposium on Foundations of Computer Science (FOCS)	<i>2025</i>
Symposium on Discrete Algorithms (SODA)	<i>2022-2024, 2026</i>
Innovations in Theoretical Computer Science (ITCS)	<i>2024-2026</i>
International Colloquium on Automata, Languages, and Programming (ICALP)	<i>2023, 2025</i>
Symposium on Principles of Database Systems (PODS)	<i>2025</i>
Symposium on Simplicity in Algorithms (SOSA)	<i>2026</i>
European Symposium on Algorithms (ESA)	<i>2022-2025</i>

Symposium on Theoretical Aspects of Computer Science (STACS)	<i>2026</i>
International Symposium on Algorithms and Computation (ISAAC)	<i>2025</i>
Symposium on Principles of Distributed Computing (PODC)	<i>2021</i>

TEACHING AND MENTORING

Directed Reading Program (DRP) Mentor for Women in Mathematics (WiM) University of Waterloo	<i>Winter 2024</i>
Research Experiences for Undergraduates (REU) Mentor along with my advisor Sepehr Assadi Rutgers University/DIMACS	<i>Summer 2023</i>
Guest Lectures on Sublinear and Streaming Algorithms PACT (Program in Algorithmic and Combinatorial Thinking) <i>Princeton University</i>	<i>Summer 2020-2025</i>
Guest Lecture, Randomized Algorithms (CS 761) University of Waterloo	<i>Winter 2025</i>
Teaching Assistant, Design and Analysis of Computer Algorithms (CS 344) Rutgers University	<i>Spring 2021, 2022, Fall 2021</i>
Teaching Assistant, Introduction to Discrete Structures (CS 205) Rutgers University	<i>Fall 2020, Summer 2021</i>
Guest Lecture, Design and Analysis of Algorithms (CS 371) Rutgers University–Camden	<i>Fall 2019</i>
Teaching Assistant, Discrete Mathematics (PACT) Princeton University	<i>Summer 2019</i>

References

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Associate Professor, Faculty of Mathematics Research Chair
University of Waterloo
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Dr. Christian Konrad
Senior Lecturer
University of Bristol
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Sanjeev Khanna
Professor
New York University
Email: sanjeev.khanna@nyu.edu