

VIHAN SHAH

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PROFESSIONAL EXPERIENCE

University of Birmingham

September 2025 - Present

Postdoctoral Researcher

School of Computer Science

Host: Sagnik Mukhopadhyay

EDUCATION

University of Waterloo

September 2023 - September 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

September 2020 - September 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

September 2019 - May 2020

BA in Computer Science

Camden College of Arts and Sciences

Mahindra Ecole Centrale

August 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>October 2023</i>
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TALKS

University of Toronto , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>October 2025</i>
University of Waterloo , Invited Seminar Talk “Sublinear time lower bounds for approximating matching size using non-adaptive queries”	<i>October 2025</i>
University of Waterloo , Seminar Talk “An Improved Fully Dynamic Algorithm for Counting 4-Cycles in General Graphs”	<i>June 2025</i>

Toyota Technological Institute at Chicago, Invited Seminar Talk
Young Researcher Seminar Series
“Space Complexity of Minimum Cut Problems in Single-Pass Streams”

April 2025

University of Waterloo, Seminar Talk
“Space Complexity of Minimum Cut Problems in Single-Pass Streams”

March 2025

Dartmouth College, Invited Seminar Talk
“Space Complexity of Minimum Cut Problems in Single-Pass Streams”

January 2025

Rutgers University, Invited Talk, Reading Group
“Learning-augmented Maximum Independent Set”

June 2024

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

EXTERNAL REVIEWER

Symposium on Theory of Computing (STOC)	2022, 2024, 2025
Symposium on Foundations of Computer Science (FOCS)	2025
Symposium on Discrete Algorithms (SODA)	2022, 2023, 2024, 2026
Innovations in Theoretical Computer Science (ITCS)	2024, 2025, 2026
Symposium on Principles of Database Systems (PODS)	2025
Symposium on Simplicity in Algorithms (SOSA)	2026
European Symposium on Algorithms (ESA)	2022, 2023, 2024, 2025
International Colloquium on Automata, Languages, and Programming (ICALP)	2023, 2025
International Symposium on Algorithms and Computation (ISAAC)	2025
Symposium on Principles of Distributed Computing (PODC)	2021

TEACHING AND MENTORING

Directed Reading Program (DRP)	Winter 24
Mentor for Women in Mathematics (WiM)	
University of Waterloo	
Research Experiences for Undergraduates (REU)	Summer 23
Mentor along with my advisor Sepehr Assadi	
Rutgers University/DIMACS	

Guest Lectures on Sublinear and Streaming Algorithms
PACT (Program in Algorithmic and Combinatorial Thinking)
Princeton University

Summer 20, 21, 22, 23, 24

Guest Lecture, Randomized Algorithms (CS 761)
University of Waterloo

Winter 25

Teaching Assistant, Design and Analysis of Computer Algorithms (CS 344)
Rutgers University

Spring 21, 22, Fall 21

Teaching Assistant, Introduction to Discrete Structures (CS 205)
Rutgers University

Fall 20, Summer 21

Guest Lecture, Design and Analysis of Algorithms (CS 371)
Rutgers University–Camden

Fall 19

Teaching Assistant, Discrete Mathematics (PACT)
Princeton University

Summer 19

REFERENCES

Dr. Sagnik Mukhopadhyay
Associate Professor
University of Birmingham
Email: s.mukhopadhyay@bham.ac.uk

Dr. Sepehr Assadi
Associate Professor, Faculty of Mathematics Research Chair
University of Waterloo
Email: sepehr@assadi.info

Dr. Christian Konrad
Senior Lecturer
University of Bristol
Email: christian.konrad@bristol.ac.uk

Dr. Prantar Ghosh
Assistant Professor
Tennessee Tech University
Email: pghosh@ntech.edu