

VIHAN SHAH

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PROFESSIONAL EXPERIENCE

University of Birmingham
Postdoctoral Researcher
School of Computer Science
Host: Sagnik Mukhopadhyay

September 2025 - Present

EDUCATION

University of Waterloo
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”

September 2023 - September 2025

Rutgers University
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

September 2020 - September 2023

Rutgers University
BA in Computer Science
Camden College of Arts and Sciences

September 2019 - May 2020

Mahindra Ecole Centrale
Completed 3 years of B.Tech in Computer Science

August 2016 - May 2019

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**
(solo-authored student work)

SODA 2026

**An Improved Fully Dynamic Algorithm for Counting 4-Cycles
in General Graphs using Fast Matrix Multiplication**
with Sepehr Assadi.

PODS 2025

**Fully Dynamic Adversarially Robust Correlation Clustering
in Polylogarithmic Update Time**

AISTATS 2025

with Vladimir Braverman, Prathamesh Dharangutte, Shreyas Pai and Chen Wang.

Space Complexity of Minimum Cut Problems in Single-Pass Streams
with Matthew Ding, Alexandro Garces, Jason Li, Honghao Lin, Jelani Nelson,
and David Woodruff.

ITCS 2025

Learning-augmented Maximum Independent Set
with Vladimir Braverman, Prathamesh Dharangutte and Chen Wang.

APPROX 2024

**New Lower Bounds in Merlin-Arthur Communication and
Graph Streaming Verification**
with Prantar Ghosh

ITCS 2024

**Streaming Algorithms and Lower Bounds for Estimating
Correlation Clustering Cost**
with Sepehr Assadi and Chen Wang

NeurIPS 2023

Tight Bounds for Vertex Connectivity in Dynamic Streams
with Sepehr Assadi

SOSA 2023

**Generalizing Greenwald-Khanna Streaming Quantile Summaries
for Weighted Inputs**
with Sepehr Assadi, Nirmit Joshi and Milind Prabhu

ICDT 2023

Space Optimal Vertex Cover in Dynamic Streams
with Kheeran K. Naidu (student-only paper)

APPROX 2022

**An Asymptotically Optimal Algorithm for Maximum
Matching in Dynamic Streams**
with Sepehr Assadi

ITCS 2022

HONORS AND AWARDS

NeurIPS Scholar Award

October 2023

TALKS

University of Toronto, Invited Seminar Talk

October 2025

“Sublinear time lower bounds for approximating matching size using non-adaptive queries”

University of Waterloo, Invited Seminar Talk

October 2025

“Sublinear time lower bounds for approximating matching size using non-adaptive queries”

University of Waterloo, Seminar Talk

June 2025

“An Improved Fully Dynamic Algorithm for Counting 4-Cycles in General Graphs”

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)	<i>2022, 2024, 2025</i>
Symposium on Foundations of Computer Science (FOCS)	<i>2025</i>
Symposium on Discrete Algorithms (SODA)	<i>2022, 2023, 2024, 2026</i>
Innovations in Theoretical Computer Science (ITCS)	<i>2024, 2025, 2026</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, 2023, 2024, 2025</i>
International Colloquium on Automata, Languages, and Programming (ICALP)	<i>2023, 2025</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) *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
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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@tnstate.edu