

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**

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

Oct 2023

TALKS

University of Warwick, Invited Seminar Talk
“Sublinear time lower bounds for approximating matching size using non-adaptive queries”

Feb 2026

University of Liverpool, Invited Seminar Talk
“Sublinear time lower bounds for approximating matching size using non-adaptive queries”

Jan 2026

Tata Institute of Fundamental Research, Invited Seminar Talk
“Sublinear time lower bounds for approximating matching size using non-adaptive queries”

Dec 2025

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

Sagnik Mukhopadhyay Associate Professor University of Birmingham Email: s.mukhopadhyay@bham.ac.uk	Sepehr Assadi Associate Professor, Faculty of Mathematics Research Chair University of Waterloo Email: sepehr@assadi.info
Christian Konrad Senior Lecturer University of Bristol Email: christian.konrad@bristol.ac.uk	Sanjeev Khanna Professor New York University Email: sanjeev.khanna@nyu.edu