

# Ayush Khaitan

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🌐 [ayushkhaitanrutgers.github.io](https://ayushkhaitanrutgers.github.io)

## Research Interests

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Automated reasoning and machine learning, Combinatorics, Differential Geometry.

## Employment

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**Rutgers University, New Brunswick**

*Hill Assistant Professor*

2023–Present

## Education

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**Penn State University**

*Ph.D., Mathematics*

**University Park, PA**

2017–2023

**Birla Institute of Technology and Science**

*B.E., Mechanical Engineering*

**Pilani, India**

2011–2015

**SJI International**

*International Baccalaureate, Keppel Magus scholar from India*

**Singapore**

2008–2010

## Publications

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**2025: An LLM-CAS framework for proving asymptotic inequalities** with [Vijay Ganesh](#) (ICLR 2026, submitted). [arXiv link](#). Our [tool](#) was recently [highlighted](#) by Terence Tao.

**2025: Elementary symmetric polynomials under the fixed point measure** with [Bhargav Narayanan](#) and [Ishan Mata](#) (submitted). [arXiv link](#).

**2024: Computing renormalized curvature integrals on Poincaré-Einstein manifolds** with [Jeffrey Case](#), [Yueh-Ju Lin](#), [Aaron Tyrell](#) and [Wei Yuan](#) (submitted). [arXiv link](#).

**2023: Ambient metric for manifolds with density and the Ricci flow** (Accepted at Advances in Mathematics)  
[arXiv link](#).

**2022: The weighted ambient metric** with [Jeffrey S. Case](#), SIGMA **18** (2022), 086, 21 pages.  
[Journal Link](#)

**2022: GJMS operators of smooth metric measure spaces** (submitted). [arXiv link](#)

**2022: Weighted renormalized volume coefficients**(submitted). [arXiv link](#)

## Research activities

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**Co-organizer:** JMM Panel on the use of AI tools to aid Mathematics research. [Panel website](#).  
Joint Mathematics Meetings, 2025 in Seattle

**Co-organizer:** LLMs in Mathematics research group, Rutgers University. [Research group website](#). 2023–Present

**Co-organizer:** Complex geometry and Harmonic analysis seminar, Rutgers University. [Seminar website](#). 2024–Present

**Co-organizer:** Special session on recent developments in geometric analysis, AMS Eastern Sectional Meeting 2024, Howard University, Washington D.C. [Meeting website](#). April, 2024

**Co-organizer:** AI and Math seminar, Rutgers University. 2024–Present

## Teaching

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**Calculus I:** Penn State University, Multiple semesters

**Calculus II:** Penn State University, Multiple semesters

**Linear Algebra:** Penn State University, One semester

**Plane trigonometry:** Penn State University, One semester

**Linear algebra:** Rutgers University, one semester

**History of Mathematics:** Rutgers University, one semester

**Calculus for engineers:** Rutgers University, one semester

## Invited Talks

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**2022:** Geometry, Topology and Dynamical Systems seminar, University of Texas at Dallas

**2022:** Geometry Luncheon seminar, Penn State University

**2023:** Geometric Analysis Seminar, Rutgers University

**2023:** Nonlinear Analysis Seminar, Rutgers University

**2023:** Geometry, Topology and Dynamical Systems seminar, University of Texas at Dallas

**2023:** Geometry/Topology seminar, Stony Brook University

**2024:** Colloquium, Rutgers University, Newark

**2025:** Geometry and Topology seminar, University of Washington, St Louis

**2025:** Special session on geometric analysis and PDEs, AMS Eastern Sectional Meeting, 2025, Hartford, CT

**2025:** CUNY Geometric Analysis Seminar, City University of New York, NY

**2025:** Brown University Geometric Analysis Seminar, Providence, RI

## Awards

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**2008:** Keppel Magus Scholarship (\$40,000), IB Diploma in Singapore, one scholar from Calcutta, India

**2009:** Bronze medal, Singapore Math Olympiad

**2017:** Distinguished Graduate Fellowship, Penn State University, given to 10 incoming graduate students across all departments

**2022:** Pritchard Dissertation Fellowship, Penn State University, given to 2 graduating PhD students in the Mathematics department

**2024-2026:** AIM SQuaRE Grant with Jeffrey Case, Yueh-Ju Lin, Aaron Tyrell and Wei Yuan

**2025:** AMS Travel grant, Mathematical Congress of the Americas