

Swaroop Hegde

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Research Interests

Additive Combinatorics, Extremal Combinatorics, Probabilistic Methods in Combinatorics

Education

University of Georgia, PhD in Mathematics – Athens, GA Aug 2021 – present

• Advisor: Giorgis Petridis

National Institute of Science Education and Research (NISER), Integrated M.Sc. in Mathematics – Bhubaneswar, India Aug 2015 – May 2020

• Supervisor: Brundaban Sahu

• Master's Thesis: Combinatorics and Representation Theory of Symmetric Groups

Teaching Experience

Graduate Student Instructor, University of Georgia – Athens, GA Aug 2021 – present

Responsible for preparing course notes, delivering lectures, writing exams/quizzes, holding office hours, and grading. Courses Taught:

• **Calculus I (Math 2250)**: Spring 2025, Fall 2024, Fall 2023, Spring 2023, Fall 2022

• **PreCalculus (Math 1113)**: Spring 2026 (x2), Fall 2025 (x2), Spring 2024 (x2), Spring 2022 (x2), Fall 2021

• **Online Precalculus (Math 1113E)**: Summer 2024

Publications

An Inverse Result for Ruzsa's Inequality on Triple Sumsets Oct 2025

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arxiv.org/abs/2510.20073 (arXiv preprint arXiv:2510.20073)

Awards

David Galewski Outstanding Graduate Teaching Award – Mathematics Department, UGA Apr 2024

Outstanding Teaching Assistant Award – Center for Teaching and Learning, UGA Mar 2024

Certificate of Merit – School of Mathematical Sciences, NISER Sept 2018

• For outstanding performance in the Spring 2018 semester.

INSPIRE Scholarship Award – Dept. of Science and Technology, Govt. of India Jan 2015

All-India Rank 12116 – IIT-JEE Mains Exam Jan 2015

• Top 1 percentile of all students who appeared for the exam nationwide.

Service

Co-organizer of the Graduate Student Seminar, Mathematics Department, UGA – Athens, GA Jan 2025 – May 2025

Co-facilitator of Precalculus working group, Mathematics Department, UGA – Athens, GA Jan 2024 – May 2024

Volunteer for High School Math Tournament, University of Georgia – Athens, GA Oct 2023 – Oct 2024

• Volunteered in Oct 2023 and Oct 2024.

Peer Mentor for first year graduate students, Mathematics Department, UGA – Athens, GA Aug 2023 – May 2025

Secretary, Student Chapter of AMS, University of Georgia – Athens, GA Aug 2022 – May 2023

Selected Talks

An Inverse Result for Ruzsa's Inequality on Triple Sumsets – Discrete Math Seminar, Iowa State University (virtual)	Oct 2025
An Inverse Result for Ruzsa's Inequality on Triple Sumsets – CanaDAM Conference, Ottawa	May 2025
An Inverse Result for Ruzsa's Inequality on Triple Sumsets – Integers Conference, UGA	May 2025
An Inverse Result for Ruzsa's Inequality on Triple Sumsets – Number Theory Seminar, UGA	Apr 2025
Asymptotics of the Ramsey Number $r(4,t)$ – Oral Qualifying Exam, UGA	Mar 2024
AKS Algorithm for Primality Testing – Combinatorial Number Theory Seminar, UGA	Oct 2023
A Polygon Problem – Graduate Student Seminar, UGA	Oct 2023
The RSK Correspondence – Graduate Student Seminar, UGA	Apr 2023
Almost Periods of Convolutions – Additive Combinatorics Seminar, UGA	Feb 2023
Cores and Quotients of Integer Partitions – Graduate Student Seminar, UGA	Nov 2022
Rédei's Theorem and Szőnyi Method – Polynomial Methods Seminar, UGA	Sept 2021
Roth's Theorem via Finite Fourier Analysis – Math Seminar, NISER	Apr 2019
Pebbling the Chessboard – NISER Open Day	Apr 2018
The Story of Dimension – MathematiX Club, NISER	Feb 2017
Clock Arithmetic – NISER Open Day (for high school students)	Apr 2016
Gödel's Incompleteness Theorems – MathematiX Club, NISER	Nov 2015

Conferences and Workshops

PCMI 2025 Graduate Summer School on Extremal Combinatorics – Park City, Utah	July 2025
Graduate Research Workshop in Combinatorics – Iowa State University, Ames, Iowa	June 2025
CanaDAM Conference 2025 – Ottawa, Ontario, Canada	May 2025
Integers Conference 2025 – University of Georgia, Athens, GA	May 2025
Algebraic and Analytic Methods in Combinatorics – SLMath, Berkeley, CA	Mar 2025
Introductory Workshop - Graph Theory – SLMath, Berkeley, CA	Feb 2025
Early-Career Conference in Combinatorics – UIUC, Illinois	June 2024
33rd Cumberland Conference on Combinatorics – Mississippi State University	May 2024
Formalization of Mathematics – SLMath, Berkeley, CA	June 2023
Integers Conference 2023 – University of Georgia, Athens, GA	May 2023
ATM-Schools AIS on Representation Theory of Finite Groups – CMI, Chennai, India	June 2017
National Science Camp (VIJYOSHI) – Kolkata, India	Dec 2015

Selected Coursework

Graduate Courses: Ramsey Theory, Additive Combinatorics I & II, Probabilistic Methods in Combinatorics, Ergodic Theory, The Circle Method, Equations with Prime Variables, Algebraic Graph Theory, Quiver Representations, Lie Algebras, Hopf Algebras

Reading Courses: Asymptotics of Ramsey Number $R(4,t)$, Kelley-Meka bound for Roth's theorem, Improvements on Freiman's Theorem, Polynomial Methods in Combinatorics, Reflection Groups

Mentoring

Directed Reading Program, University of Georgia

- Spring 2025: Mentored undergraduate student Benjamin Wang-Tie on 'Applications of Entropy in Combinatorics'.
- Summer 2021: Mentored undergraduate student Aakash Khanal on 'Mathematics of Card Shuffling'.