Rishabh Sarma | Curriculum Vitae

Department of Mathematics, Little Hall 352
University of Florida, Gainesville, FL-32611, US
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Education

University of Florida   **Gainesville, United States**
PhD in Mathematics   *2019-present*
GPA – 4.00/4.00
Thesis : Modular symmetries for rank-type partition statistics
Advisor : Frank Garvan

Université Paris Cité   **Paris, France**
Chateaubriand Fellow   *Fall 2023 (Aug-Dec)*
Advisor : Jeremy Lovejoy

Indian Institute of Technology, Guwahati   **India**
Master of Science in Mathematics and Computing   *2016-2018*
Masters thesis : Construction of modular forms from theta functions
Advisor : Anupam Saikia

Tezpur University   **India**
Bachelor of Science in Mathematics (with distinction)   *2013-2016*

Research interests

Partitions, q-series, modular forms

Publications and preprints

1. New symmetries for overpartition rank and crank functions (with Frank Garvan) [preprint]

2. On new minimal excludants of overpartitions related to some q-series of Ramanujan (with Aritram Dhar and Avi Mukhopadhyay), *Bulletin of the Australian Mathematical Society*, **accepted**, preprint : arXiv:2409.06121

3. Transformation and symmetries for the Andrews-Garvan crank function, *Hardy-Ramanujan Journal*, **accepted**, preprint : arXiv:2301.10991

4. Bailey pairs, radial limits of q-hypergeometric false theta functions, and a conjecture of Hikami (with Jeremy Lovejoy), *Kyushu Journal of Mathematics*, **accepted**, preprint : arXiv:2402.11529

5. Combinatorial interpretations of cranks of overpartitions and partitions without repeated odd parts (with Frank Garvan), *SIGMA Symmetry, Integrability and Geometry : Methods and Applications*, SIGMA **20** (2024), 097, 14 pp

6. New symmetries for Dyson's rank function (with Frank Garvan), *Ramanujan Journal*, **65** (2024), 1883-1939

7. Generalization of the extended minimal excludant of Andrews and Newman (with Aritram Dhar and Avi Mukhopadhyay), *Journal of Integer Sequences*, **26** (2023), Article No. 23.3.7

8. An application of the Jacobi Triple Product, proposed by G. E. Andrews and M. Merca, Problems and Solutions, *The American Mathematical Monthly*, **130**(8) (2023), 765–778

9. On a Euler-Ramanujan formula, Dirichlet series and minimal surfaces (with Rukmini Dey and Rahul Kumar Singh), *Proc.Indian Acad.Sci.(Math. Sci.)*, **130** (2020), Article No. 61

Awards & Achievements

- **CLAS Dissertation Fellowship**, College of Liberal Arts and Sciences, University of Florida, 2025
- **GSC Travel Grant**, Graduate Student Council, University of Florida, Spring 2025
- **Chateaubriand Fellowship**, CNRS and Embassy of France in United States, Fall 2023
- **Chat Yin Ho Award** for outstanding graduate student of the year, Dept. of Mathematics, University of Florida, 2022
- **CLAS Graduate Student Travel Award**, University of Florida, Fall 2022, Spring 2023 & Summer 2024
- **CAM travel grant**, Center for Applied Mathematics, Department of Mathematics, University of Florida, Fall 2022
- **Mitacs Globalink Research Award** - for research in Canada, 2018
- **Summer Research Fellowship** of the Indian Academy of Sciences, 2015 & 2016
- **INSPIRE Scholarship** (awarded by Department of Science and Technology, Government of India), 2013-18
- **1st rank** in the State Board examination of XII-th standard, 2013

Research visits

University of Cologne, Germany
Visiting Student *December 15–20, 2023*
Host : Kathrin Bringmann

International Centre for Theoretical Sciences, TIFR, Bangalore, India
Long Term Visiting Student *Aug, 2018–April, 2019*
Research topic : Dirichlet series and Ramanujan identities
Advisor : Rukmini Dey

Simon Fraser University, Burnaby, Canada
SFU-IIT India Initiative Research Intern *May–July, 2018*
Project topic : On a conjecture classifying Littlewood cyclotomic polynomials
Advisor : Stephen Choi

Indian Statistical Institute, New Delhi
Summer Research Fellow *June–July, 2016*
Project Topic : Recurrence sequences and primitive divisors and their application in solving Diophantine equations
Advisor : Shanta Laishram

Indian Statistical Institute, Bangalore
Summer Research Fellow *June–July, 2015*
Project topic : A study on Spectral theorem for normal matrices
Advisor : Jaydeb Sarkar

Talks

Seminar in Partition Theory, q-series and Related Topics, Michigan Tech (held online)
"Bailey pairs and radial limits of q-hypergeometric false theta functions" *6 Feb, 2025*

Joint Mathematics Meetings (JMM) 2025, Seattle, WA
AMS Special Session on Partition Theory and q-series *8-11 Jan, 2025*
"New symmetries for overpartition rank and crank functions"

AMS Fall Central Sectional Meeting, University of Texas at San Antonio, TX
Special Session on Additive Number Theory and Modular Forms *14-15 Sept, 2024*
"Cranks of overpartitions and partitions without repeated odd parts – combinatorial interpretations and mock theta connections"

The Legacy of Ramanujan conference, Penn State University
Poster presentation session *6-9 June, 2024*
"Combinatorial interpretations and mock theta connections of two residual cranks of overpartitions"

International conference on modular forms and q-series, University of Cologne
Speed talk session *11-15 March, 2024*
"Pursuing Dyson's dream - unraveling new symmetries for rank-type statistics"

Joint Mathematics Meetings (JMM) 2023, Boston, MA
AMS Special Session on Quadratic Forms, Modular Forms, and Applications *4-7 Jan, 2023*
"New symmetries for the Andrews-Garvan crank function"

SASTRA-Ramanujan Award ceremony and conference, Kumbakonam
"New symmetries for rank and crank generating functions" *20-22 Dec, 2022*

AMS Fall Central Sectional Meeting, University of Texas at El Paso, TX
Special Session on The Intersection of Number Theory and Combinatorics *17-18 Sept, 2022*
"Relating the smallest missing part to other partition theoretic objects and statistics"

Number Theory seminar, Department of Mathematics, University of Florida
"Transformation and symmetries for Dyson's rank function" *13 Sept, 2022*

Student Symposium in Combinatorics, UNSW (held virtually)
"Relating the smallest missing part to other partition statistics" *30 May–3 June, 2022*

47th Annual NY State Graduate Mathematics Conference, Syracuse University
"New symmetries for Dyson's rank function" *2 April, 2022*

Other conferences and workshops attended

Joint Mathematics Meetings (JMM) 2022
held virtually   *6-9 April, 2022*

AMS Fall Eastern Sectional Meeting
held virtually, formerly at Pennsylvania State University   *3-4 Oct, 2020*

AMS Fall Southeastern Joint Sectional Meeting
University of Florida, Gainesville   *2-3 Nov, 2019*

Advanced Instructional School on Modular forms
Indian Institute of Technology, Guwahati   *13 May-1 June, 2019*

Algebraic and analytic aspects of automorphic forms
International Centre for Theoretical Sciences, TIFR, Bangalore   *25 Feb-7 March, 2019*

Annual Foundation School - **I**
Indian Institute of Technology, Guwahati   *Dec 1-31, 2016*

Advanced topics on Discrete Logarithms over Finite Fields and Elliptic Curves
Indian Statistical Institute, New Delhi   *14-22 July, 2016*

Asian Science Camp
Nanyang Technological University, Singapore   *24-29 Aug, 2014*

Referee work

Refereed articles for **The Ramanujan Journal** and the **Journal of Algebraic Combinatorics**

Teaching experience at University of Florida

Summary of role as **Graduate Teaching Assistant (2019-2024)** : Appointed as a teaching assistant for 11 semesters (4 online, 4 in-person and 3 hybrid) and as an instructor for 4 semesters (3 online and 1 in-person) in five years at UF

- Teaching assistant for **Elementary Differential Equations** (MAP 2302), Spring 2025
- Teaching assistant for **Survey of Calculus I** (MAC 2233), Fall 2024
- Teaching assistant for **Calculus III** (MAC 2313), Summer 2024
- Teaching assistant for **Differential Equations for Engineers and Physical Scientists** (MAP 4305) & **Intermediate Differential Equations** (MAP 5304), Spring 2024
- Co-instructor for **Basic College Algebra** (MAC 1105), Summer 2023 & Spring 2023
- Teaching assistant for **Calculus III** (MAC 2313) and **Calculus I** (MAC 2311), Fall 2022
- Instructor for **Precalculus Algebra** (MAC 1140), Summer 2022
- Teaching assistant for **Precalculus Algebra** (MAC 1140), Spring 2022
- Teaching assistant for **Survey of Calculus II** (MAC 2234), Fall 2021
- Teaching assistant for **Calculus II** (MAC 2312), Summer 2021 & Spring 2021
- Teaching assistant for **Calculus I** (MAC 2311), Fall 2020
- Co-instructor for **Precalculus Algebra** (MAC 1140), Summer 2020
- Teaching assistant for **Calculus I** (MAC 2311), Spring 2020 & Fall 2019

Graduate coursework

Modern Algebra, Modern Analysis, Functional Analysis, Complex Analysis, Numerical Analysis, Theory of partitions and q-series, Modular Forms and Mock-Theta Functions, Topics in Analytic Number Theory and Sieve Theory, Topics in Combinatorial Theory, Galois Theory, Algebraic Topology, Differential Topology, Probability and Potential Theory

Computer skills

C, C++, LaTeX, Maple, Python, Sage

References

Frank Garvan	**Krishnaswami Alladi**	**Jeremy Lovejoy**	**Melissa Shabazz** (teaching)
Department of Mathematics	Department of Mathematics	CNRS	Department of Mathematics
University of Florida	University of Florida	Université Paris Cité	University of Florida
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