

Rishabh Sarma | Curriculum Vitae

Department of Mathematics, 309 McAllister Building
The Pennsylvania State University, University Park, PA-16802, US
✉ rishabh.sarma@psu.edu • 🌐 <https://rishabh-sarma.github.io>

Education

The Pennsylvania State University <i>S. Chowla Research Assistant Professor</i>	State College, United States 2025-2028
University of Florida <i>PhD in Mathematics</i> GPA – 4.00/4.00 Thesis : Modular symmetries for rank-type partition statistics Advisor : Frank Garvan	Gainesville, United States 2019-2025
Université Paris Cité <i>Chateaubriand Fellow</i> Advisor : Jeremy Lovejoy	Paris, France Fall 2023 (Aug-Dec)
Indian Institute of Technology Guwahati <i>Master of Science in Mathematics and Computing</i> Masters thesis : Construction of modular forms from theta functions Advisor : Anupam Saikia	India 2016-2018
Tezpur University <i>Bachelor of Science in Mathematics (with distinction)</i>	India 2013-2016

Research interests

Modular forms, partitions, q -series, special functions, Ramanujan mathematics, experimental mathematics

Articles in preparation

- Andrews-Merca type identities for classes of partitions with only one even part (with Ae Ja Yee)
- Symmetries for M_2 -rank and crank of partitions and overpartitions (with Frank Garvan)
- Identities for rank and crank differences in terms of Dedekind eta-quotients (with Frank Garvan)
- Overpartitions with repeated smallest non-overlined part (with Amita Malik)
- Further analogs of Andrews' spt-function identity
- Companions of Euler's Pentagonal Number Theorem via minimal excludants of partitions and overpartitions (with Aritram Dhar, Rajat Gupta and Avi Mukhopadhyay)
- Symmetries for overpartition rank and crank functions (with Frank Garvan)

Publications and preprints

1. Bailey pairs, radial limits of q -hypergeometric false theta functions, and a conjecture of Hikami (with Jeremy Lovejoy), **to appear**, *Kyushu J. Math.*, Vol.79 no.2 (2025)
2. On new minimal excludants of overpartitions related to some q -series of Ramanujan (with Aritram Dhar and Avi Mukhopadhyay), *Bull. Austral. Math. Soc.*, **112(1)** (2025), 1-13
3. Transformation and symmetries for the Andrews-Garvan crank function, *Hardy-Ramanujan J.*, **47** (2024), 1-25
4. Combinatorial interpretations of cranks of overpartitions and partitions without repeated odd parts (with Frank Garvan), *SIGMA Symmetry Integrability Geom. Methods Appl.*, *SIGMA* **20** (2024), 097, 14 pp
5. New symmetries for Dyson's rank function (with Frank Garvan), *Ramanujan J.*, **65** (2024), 1883-1939
6. Generalization of the extended minimal excludant of Andrews and Newman (with Aritram Dhar and Avi Mukhopadhyay), *J. Integer Seq.*, **26** (2023), Article No. 23.3.7
7. Solution to 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
8. 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

- Assistant Professor job offer (*declined*) from Florida Gulf Coast University, Fort Myers (2025)
- 3-year Postdoctoral Fellow job offer (*declined*) from Academia Sinica, Taiwan (2025)
- CLAS Dissertation Fellowship, College of Liberal Arts and Sciences, University of Florida, Summer 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 Math, 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, Dept. 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

Host : Kathrin Bringmann

December 15–20, 2023

International Centre for Theoretical Sciences, TIFR, Bangalore, India

Long Term Visiting Student

Research topic : Dirichlet series and Ramanujan identities

Advisor : Rukmini Dey

Aug, 2018–April, 2019

Simon Fraser University, Burnaby, Canada

SFU-IIT India Initiative Research Intern

Project topic : On a conjecture classifying Littlewood cyclotomic polynomials

Advisor : Stephen Choi

May–July, 2018

Indian Statistical Institute, New Delhi

Summer Research Fellow

Project Topic : Recurrence sequences and primitive divisors and their application in solving Diophantine equations

Advisor : Shanta Laishram

June–July, 2016

Indian Statistical Institute, Bangalore

Summer Research Fellow

Project topic : A study on Spectral theorem for normal matrices

Advisor : Jaydeb Sarkar

June–July, 2015

Talks

2026 Gainesville International Number Theory conference, University of Florida

Conference in honor of Krishna Alladi's 70th birthday

To be decided

18-22 March, 2026

AMS Fall Southeastern Sectional Meeting, Tulane University, New Orleans, LA

AMS Special Session on Experimental Mathematics

"Finding identities for rank and crank of partitions and overpartitions using Maple"

3-5 Oct, 2025

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

"New symmetries for overpartition rank and crank functions"

8-11 Jan, 2025

Seminar on Number Theory, Tezpur University (held online)	"Bailey pairs and radial limits of q -hypergeometric false theta functions"	19 Nov, 2024
AMS Fall Central Sectional Meeting, University of Texas at San Antonio, TX	<i>AMS Special Session on Additive Number Theory and Modular Forms</i> "Crank's of overpartitions and partitions without repeated odd parts – combinatorial interpretations and mock theta connections"	14-15 Sept, 2024
The Legacy of Ramanujan conference, Penn State University, PA	<i>Poster presentation session</i> "Combinatorial interpretations and mock theta connections of two residual cranks of overpartitions"	6-9 June, 2024
Number Theory seminar, Department of Mathematics, University of Florida	"Bailey pairs and radial limits of q -hypergeometric false theta functions"	9 April, 2024
International conference on modular forms and q-series, University of Cologne	<i>Speed talk session</i> "Pursuing Dyson's dream - unraveling new symmetries for rank-type statistics"	11-15 March, 2024
Joint Mathematics Meetings (JMM) 2023, Boston, MA	<i>AMS Special Session on Quadratic Forms, Modular Forms, and Applications</i> "New symmetries for the Andrews-Garvan crank function"	4-7 Jan, 2023
ASTRA-Ramanujan Award ceremony and conference, Kumbakonam, India	"New symmetries for rank and crank generating functions"	20-22 Dec, 2022
AMS Fall Central Sectional Meeting, University of El Paso, TX	<i>AMS Special Session on The Intersection of Number Theory and Combinatorics</i> "Relating the smallest missing part to other partition theoretic objects and statistics"	17-18 Sept, 2022
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 online)	"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
Masters seminar, Department of Mathematics, Indian Institute of Technology Guwahati	"Cyclotomic polynomials and the Bunyakowski Conjecture"	27 Oct, 2017
<hr/>		
Other conferences and workshops attended		
Joint Mathematics Meetings (JMM) 2022	<i>held virtually</i>	6-9 April, 2022
AMS Fall Eastern Sectional Meeting	<i>held virtually, formerly at Pennsylvania State University</i>	3-4 Oct, 2020
AMS Fall Southeastern Joint Sectional Meeting	<i>University of Florida, Gainesville</i>	2-3 Nov, 2019
Advanced Instructional School on Modular forms	<i>Indian Institute of Technology Guwahati</i>	13 May-1 June, 2019
Algebraic and analytic aspects of automorphic forms	<i>International Centre for Theoretical Sciences, TIFR, Bangalore</i>	25 Feb-7 March, 2019
Annual Foundation School - I	<i>Indian Institute of Technology Guwahati</i>	Dec 1-31, 2016

Advanced topics on Discrete Logarithms over Finite Fields and Elliptic Curves	
<i>Indian Statistical Institute, New Delhi</i>	14-22 July, 2016
26th Mid-Year Meeting of scientific lectures of the Indian Academy of Sciences	
<i>Indian Institute of Science, Bangalore</i>	3-4 July, 2015
National Board of Higher Mathematics Workshop on Algebra and Analysis	
<i>Tezpur University</i>	17-23 Feb, 2015
Asian Science Camp	
<i>Nanyang Technological University, Singapore</i>	24-29 Aug, 2014

Referee work

Refereed articles for **The Ramanujan Journal**, **Journal of Algebraic Combinatorics** and **The Journal of the Indian Mathematical Society**

Teaching experience

Pennsylvania State University

- Instructor for **Calculus with Analytic Geometry II** (MATH 141), Spring 2026 & Fall 2025

University of Florida

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

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++, L^AT_EX, Maple, Python, SageMath

References

Ae Ja Yee
Department of Mathematics
The Pennsylvania State University
✉ yee@psu.edu

Krishnaswami Alladi
Department of Mathematics
University of Florida
✉ alladik@ufl.edu

Frank Garvan
Department of Mathematics
University of Florida
✉ fgarvan@ufl.edu

Amine Benkiran (teaching)
Department of Mathematics
The Pennsylvania State University
✉ azb165@psu.edu

Jeremy Lovejoy
CNRS
Université Paris Cité
✉ lovejoy@math.cnrs.fr

Melissa Shabazz (teaching)
Department of Mathematics
University of Florida
✉ shabazzm@ufl.edu