

# Rishabh Sarma | Curriculum Vitae

Department of Mathematics, 309 McAllister Building  
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## Education

**The Pennsylvania State University**  
*S. Chowla Research Assistant Professor*

**State College, United States**  
2025-2028

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

**Gainesville, United States**  
2019-2025

**Université Paris Cité**  
*Chateaubriand Fellow*  
Advisor : Jeremy Lovejoy

**Paris, France**  
Fall 2023 (Aug-Dec)

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

**India**  
2016-2018

**Tezpur University**  
*Bachelor of Science in Mathematics (with distinction)*

**India**  
2013-2016

## Research interests

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

## Articles in preparation

- Congruences for GBG-rank of self-conjugate and double distinct partitions (with Ae Ja Yee)
- Further analogs of Andrews' spt-function identity
- Symmetries for  $M_2$ -rank and crank of partitions and overpartitions (with Frank Garvan)
- Partition and overpartition rank and crank differences in terms of Dedekind eta-quotients (with Frank Garvan)

## Publications and preprints

1. Companions of Euler's Pentagonal Number Theorem via minimal excludants of partitions and overpartitions (with Aritram Dhar, Rajat Gupta and Avi Mukhopadhyay), **preprint**
2. Symmetries for overpartition rank and crank functions (with Frank Garvan), **preprint**
3. 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)
4. 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
5. Transformation and symmetries for the Andrews-Garvan crank function, *Hardy-Ramanujan J.*, **47** (2024), 1-25
6. 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
7. New symmetries for Dyson's rank function (with Frank Garvan), *Ramanujan J.*, **65** (2024), 1883-1939
8. 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
9. 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

10. [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

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- **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

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### 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

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### 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)

*19 Nov, 2024*

"Bailey pairs and radial limits of  $q$ -hypergeometric false theta functions"

**AMS Fall Central Sectional Meeting, University of Texas at San Antonio, TX**

*AMS 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, PA**

*Poster presentation session*

6-9 June, 2024

"Combinatorial interpretations and mock theta connections of two residual cranks of overpartitions"

**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**

*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, India**

"New symmetries for rank and crank generating functions"

20-22 Dec, 2022

**AMS Fall Central Sectional Meeting, University of Texas at El Paso, TX**

*AMS 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 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 Bunyakovski Conjecture"

27 Oct, 2017

## Other conferences and workshops attended

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**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

## 26th Mid-Year Meeting of scientific lectures of the Indian Academy of Sciences

Indian Institute of Science, Bangalore

3-4 July, 2015

## National Board of Higher Mathematics Workshop on Algebra and Analysis

Tezpur University

17-23 Feb, 2015

## Asian Science Camp

Nanyang Technological University, Singapore

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), 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++,  $\text{\LaTeX}$ , Maple, Python, SageMath

## References

### Frank Garvan

Department of Mathematics  
University of Florida  
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### Krishnaswami Alladi

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

### Jeremy Lovejoy

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

### Melissa Shabazz (teaching)

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University of Florida  
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