

CURRICULUM VITAE

Name: **Rupam Barman**

Office Address: Professor, Department of Mathematics,
Indian Institute of Technology Guwahati, North Guwahati, Guwahati-781039, INDIA.

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Personal Details:

- Date of birth : 1st March, 1979.
- Sex : Male
- Marital Status : Married.
- Nationality : Indian.

Ph. D. Thesis: Iwasawa Invariants of Elliptic Curves and p -adic Measures.

Supervisor: Prof. Anupam Saikia, Department of Mathematics, IIT Guwahati.

Research Interests:

Algebraic Number Theory, Elliptic Curves, Iwasawa Theory, p -adic measures, Exponential Sums, Kloosterman Sums, Hypergeometric Functions over Finite Fields, p -adic Hypergeometric function, Modular Forms, Theory of Partitions and the mathematics influenced by Ramanujan.

Academic Qualifications:

Ph. D. April 2010, Department of Mathematics, IIT Guwahati.

Post doctoral research Mathematical Institute, University of Heidelberg, Germany during 2011.

Master of Science Mathematics, May 2001
(M. Sc.) (with 8.113 Cumulative Grade Point Average).
IIT Delhi, Haus Khaz, New Delhi, India.

Bachelor of Science Mathematics (Honors), Physics and Statistics, 1999
(B. Sc.) (with 1st class and distinction, 74 percentage).
Cotton College, under Gauhati University, Guwahati, India.

Employment:

1. Professor, Department of Mathematics, IIT Guwahati from 5th June 2021 to present.
2. Associate Professor, Department of Mathematics, IIT Guwahati from 1st July 2016 to 4th June 2021.
3. Assistant Professor, Department of Mathematics, IIT Delhi from 7th May 2013 to 30th June 2016.
4. Associate Professor, Department of Mathematical Sciences, Tezpur University from 13th August 2010 to 6th May 2013.
5. Assistant Professor, Department of Mathematical Sciences, Tezpur University from 1st January 2006 to 12th August 2010.
6. Lecturer, Department of Mathematical Sciences, Tezpur University from 31st October 2002 to 31st December 2005.

Awards and Recognitions:

1. A M Mathai Research Excellence Award for the year 2022 by the Society for Special Functions and their Applications (SSFA).
2. Indo-Australlian visiting fellowship by INSA to work at Newcastle University, Australlia (2012-2013).
3. Post doctoral fellowship by the Mathematical Institute, University of Heidelberg Germany during 2011.
4. Post doctoral fellowship by ICTP Trieste Italy during 2011.
5. Teacher Fellowship by National Board for Higher Mathematics for a period of three years: 2008-2011.
6. Junior Research Fellowship by the Council of Scientific and Industrial Research (CSIR), New Delhi, India, December 2000.
7. GATE 2001 in Mathematics with a percentile score of 99.56 and *All India Rank: 4*.

Research Projects (ongoing/completed):

1. Distribution of certain partition functions, Core Research Grant, SERB, Amount: 27,30,882/- (2022-2025)
2. Elliptic Curves with Complex Multiplication and Hypergeometric Sums, SERB, Amount: 6,60,000/- (June 2018 to June 2021)
3. SERB-NPDF grant: Amount: 13,20,000/- (2017–2018). Dr. Zakir Ahmed (PhD from Tezpur University) worked under this project.
4. SERB-NPDF grant: Amount: 13,20,000/- (2017–2018). Dr. Sneh Bala Sinha (PhD from HRI) worked under this project
5. Hypergeometric functions, Algebraic curves and Supercongruences, Funded by IIT Guwahati (December 2016 to December 2018).
6. Hypergeometric functions over p -adic numbers and algebraic curves, Funded by IIT Delhi (February 2015 - July 2016).
7. Iwasawa Theory of Lubin-Tate division towers and a lemma of Coleman, Amount: 1,25,000/- (UGC Minor Research project (2010–2012)).

Editorial Boards:

1. The Ramanujan Journal (since January 2023)
2. Journal of Assam Academy of Mathematics (since July 2022)

Research Publications in Refereed Journals:

71. Sulakashna and R. Barman, p -Adic hypergeometric functions and certain weight three newforms, **Journal of Mathematical Analysis and Applications**, (accepted)
70. D. Antony and R. Barman, p -Adic quotient sets: linear recurrence sequences with reducible characteristic polynomials, **Canadian Mathematical Bulletin**, (accepted)
69. G. Singh and R. Barman, Hook length biases in ordinary and t -regular partitions, **Journal of Number Theory** 264 (2024), pp. 41–58.
68. Sulakashna and R. Barman, p -Adic hypergeometric functions and traces of Frobenius of elliptic curves, **Int. J. Number Theory**, (accepted)

67. R. Barman and G. Singh, *Arithmetic properties and asymptotic formulae for $\sigma_{omex}(n)$ and $\sigma_{emex}(n)$* , **The Ramanujan Journal**, (accepted).
66. A. Bhowmik and R. Barman, *Cliques of orders three and four in the Paley-type graphs*, **Graphs and Combinatorics** 40 (2024), Article No. 80.
65. Sulakashna and R. Barman, *Number of \mathbb{F}_q -points on Diagonal hypersurfaces and hypergeometric function*, **Int. J. Number Theory** (accepted).
64. Sulakashna and R. Barman, *Diagonal hypersurfaces and elliptic curves over finite fields and hypergeometric functions*, **Finite Fields and Their Applications** 96 (2024) 102397, pp. 1–30.
63. A. Bhowmik and R. Barman, *Number of complete subgraphs of Peisert graphs and hypergeometric functions over finite fields*, **Research in Number Theory** 10 (2024), Article no. 26, 21 pages.
62. R. Barman, G. Singh and A. Singh, *Arithmetic properties of certain t -regular partitions*, **Annals of Combinatorics** 28 (2024), pp. 439–457.
61. S. Bhattacharyya, R. Barman, A. Singh and A. K. Saha, *Parity distribution and divisibility of Mex-related partition functions*, **Research in Number Theory** 10 (2024), pp. 1–10.
60. R. Barman, G. Singh and A. Singh, *Divisibility of the partition function $PDO_t(n)$ by powers of 2 and 3*, **Bulletin of Australian Math. Soc.** 109 (2024), no. 1, pp. 14–25.
59. R. Barman, G. Singh and A. Singh, *Certain Diophantine equations and new parity results for 21-regular partitions*, **Acta Arithmetica** 210 (2023), pp. 337–351.
58. A. Bhowmik and R. Barman, *Hypergeometric functions for Dirichlet characters and Peisert-like graphs over \mathbb{Z}_n* , **La Matematica**, Journal of the Association for Women in Mathematics, 2 (2023), no. 4, pp. 992–1021.
57. D. Antony and R. Barman, *p -Adic quotient sets: linear recurrence sequences*, **Bulletin of Australian Math. Soc.** 108 (2023), no. 1, 19–28.
56. A. Singh and R. Barman, *Proofs of some conjectures of Keith and Zanello on t -regular partitions*, **Pacific Journal of Mathematics** 320 (2022), no. 2, 425–436.
55. Sulakashna and R. Barman, *Certain transformations and values of p -adic hypergeometric functions*, **Research in Number Theory** 8 (2022), Article No. 93.
54. D. Antony, R. Barman and P. Miska, *p -Adic quotient sets: Diagonal forms*, **Archiv der Mathematik** 119 (2022), pp. 461–470.
53. D. Antony, R. Barman and J. Chattopadhyay, *On denseness of certain direction and generalized direction sets*, **INTEGERS** 22 (2022), Article No. A88.
52. A. Singh and R. Barman, *Divisibility of certain ℓ -regular partitions by 2*, **The Ramanujan Journal** 59 (2022), pp. 813–829.
51. D. Antony and R. Barman, *p -adic quotient sets: Cubic forms*, **Archiv der Mathematik** 118 (2022), pp. 143–149.
50. A. Singh and R. Barman, *Proof of some conjectural congruences of da Silva and Sellers*, **Bulletin of Australian Math. Soc.** 106 (2022), pp. 57–61.
49. A. Bhowmik and R. Barman, *On a Paley-type graph on \mathbb{Z}_n* , **Graphs and Combinatorics** 38 (2022), article no. 41, 25 pages.
48. R. Barman and M. Tripathi, *Certain transformations and special values of hypergeometric functions over finite fields*, **The Ramanujan Journal** 57 (4), pp. 1277–1306 (2022).
47. A. Singh and R. Barman, *Divisibility of certain singular overpartitions by powers of 2 and 3*, **Bulletin Australian Math. Soc.** 104 (2021), pp. 238–248.

46. N. Bag and R. Barman, *Higher order moments of generalized quadratic Gauss sums weighted by L -functions*, **Asian J. Mathematics** 25 (2021), no. 3, pp. 413–430.
45. A. Singh and R. Barman, *Certain eta-quotients and arithmetic density of Andrews' singular overpartitions*, **Journal of Number Theory** 229 (2021), pp. 487–498.
44. R. Barman and A. Singh, *On Mex-related partition functions of Andrews and Newman*, **Research in Number Theory** 7 (2021), no. 3, Art. No. 53, 12 pages.
43. A. Singh and R. Barman, *New density results and congruences for Andrews' singular overpartitions*, **Journal of Number Theory** 229 (2021), pp. 328–341.
42. R. Barman and A. Singh, *Mex-related partition functions of Andrews and Newman*, **Journal of Integer Sequences** 24 (2021), Article no. 21.6.3, 12 pages.
41. M. Tripathi and R. Barman, *Appell series over finite fields and Gaussian hypergeometric series*, **Research in the Mathematical Sciences** 8 (2021), Art. No. 28, 34 pages.
40. N. Bag and R. Barman, *An improved estimate of the fourth power mean of the general 3-dimensional Kloosterman sums mod p* , **Funct. Approx. Comment. Math.** 64 (2021), no. 1, pp. 39–45.
39. R. Barman, N. Saikia, *Summation identities and transformations for hypergeometric series-II*, **Funct. Approx. Comment. Math.** 61 (2020), no. 1, pp. 7–42.
38. N. Bag and R. Barman, *The fourth power mean of the general 4-dimensional Kloosterman sums mod p* , **Research in Number Theory** 6 (2020), no. 3, Art. No. 31, 15 pages.
37. M. Tripathi and R. Barman, *Certain product formulas and values of Gaussian hypergeometric series*, **Research in Number Theory** 6 (2020), no. 3, Art. No. 26, 29 pages.
36. C. Ray and R. Barman, *On Andrews' integer partitions with even parts below odd parts*, **Journal of Number Theory** 215 (2020), pp. 321–338.
35. M. Tripathi, N. Saikia and R. Barman, *Appell's hypergeometric series over finite fields*, **Int. J. Number Theory** 16 (2020), no. 4, pp. 673–692.
34. Z. Ahmed, C. Ray and R. Barman, *Congruences modulo powers of 2 for overpartition pairs into odd parts*, **J. Korean Math. Soc.** 57 (2020), no. 2, pp. 471–487.
33. C. Ray and R. Barman, *Arithmetic properties of cubic and overcubic partition pairs*, **The Ramanujan Journal** 52 (2020), pp. 243–252.
32. R. Barman and N. Saikia, *Supercongruences for truncated hypergeometric series and p -adic Gamma function*, **Math. Proc. Cambridge Phil. Soc.** 168 (2020), no. 1, pp. 171–195.
31. C. Ray and R. Barman, *Divisibility of Andrews' singular overpartitions by powers of 2 and 3*, **Research in Number Theory** 5 (2019), no. 3, Art. No. 22, 7 pages.
30. R. Barman and T. Komatsu, *Lehmer's generalized Euler numbers in hypergeometric functions*, **J. Korean Math. Soc.** 56 (2019), no. 2, pp. 485–505.
29. M. Tripathi and R. Barman, *A finite field analogue of the Appell's series F_4* , **Research in Number Theory** 4 (2018), no. 3, Art. No. 35, 23 pages.
28. R. Barman and N. Saikia, *Certain character sums and hypergeometric series*, **Pacific Journal of Math.** 295 (2018), no. 2, pp. 271–290.
27. R. Barman and N. Saikia, *Summation identities and transformations for hypergeometric series*, **Ann. Math. Québec** 42 (2018), no. 2, pp. 133–157.
26. R. Barman and C. Ray, *Infinite families of congruences for k -regular overpartitions*, **Int. J. Number Theory** 14 (2018), no. 1, pp. 19–29.

25. R. Barman and C. Ray, *Congruences for ℓ -regular overpartitions and Andrew's singular overpartition*, **The Ramanujan Journal** 45 (2018), no. 2, pp. 497–515.
24. R. Barman and C. Ray, *New congruences for overpartitions into odd parts*, **Integers** 18 (2018), Art. No. 50, 20 pages.
23. R. Barman and A. Sachdeva, *Proof of a limited version of Mao's partition rank inequality using a theta function identity*, **Research in Number Theory** 2 (2016), Art. No. 22, 6 pages.
22. R. Barman, H. Rahman and N. Saikia, *Counting points on Dwork hypersurfaces and p -adic hypergeometric function*, **Bulletin Australian Math. Soc.** 94 (2016), no. 2, pp. 208–218.
21. R. Barman and G. Kalita, *Hyperelliptic curves over \mathbb{F}_q and Gaussian hypergeometric series*, **J. Ramanujan Math. Soc.** 30 (2015), no. 3, pp. 331–348.
20. R. Barman, N. Saikia and D. McCarthy, *Summation identities and special values of hypergeometric series in the p -adic setting*, **Journal of Number Theory** 153 (2015), pp. 63–84.
19. R. Barman and N. Saikia, *Certain Transformations for Hypergeometric series in the p -adic setting*, **Int. J. Number Theory** 11 (2015), no. 2, pp. 645–660.
18. R. Barman and N. Saikia, *p -Adic gamma function and the polynomials $x^d + ax + b$ and $x^d + ax^{d-1} + b$* , **Finite Fields and Their Appl.** 29 (2014), no. 9, pp. 89–105.
17. R. Barman and N. Saikia, *p -Adic gamma function and the trace of Frobenius of elliptic curves*, **Journal of Number Theory** 140 (2014), no. 7, pp. 181–195.
16. R. Barman and N. Saikia, *On the polynomials $x^d + ax^i + b$ and $x^d + ax^{d-i} + b$ over \mathbb{F}_q and Gaussian hypergeometric series*, **The Ramanujan Journal** 35 (2014), no. 3, pp. 427–441.
15. R. Barman, G. Kalita and N. Saikia, *Hyperelliptic curves and values of Gaussian hypergeometric series*, **Archiv der Mathematik** 102 (2014), no. 4, pp. 345–355.
14. R. Barman and G. Kalita, *On the polynomial $x^d + ax + b$ over \mathbb{F}_q and Gaussian hypergeometric series*, **Int. J. Number Theory** 9 (2013), no. 7, pp. 1753–1763.
13. R. Barman, *Another look at Iwasawa λ -invariants of p -adic measures on \mathbb{Z}_p^n and Γ -transforms*, **Int. J. Number Theory** 9 (2013), no. 5, pp. 1289–1299.
12. R. Barman and G. Kalita, *Hypergeometric functions over \mathbb{F}_q and traces of Frobenius for elliptic curves*, **Proc. Amer. Math. Soc.** 141 (2013), pp. 3403–3410.
11. R. Barman and G. Kalita, *Elliptic Curves and Special Values of Gaussian hypergeometric series*, **Journal of Number Theory** 133 (2013), pp. 3099–3111.
10. R. Barman and G. Kalita, *Certain values of Gaussian hypergeometric series and a family of algebraic curves*, **Int. J. Number Theory** 8 (2012), no. 4, pp. 945–961.
9. R. Barman and G. Kalita, *Hypergeometric functions and a family of algebraic curves*, **The Ramanujan Journal** 28 (2012), no. 2, pp. 175–185.
8. R. Barman and A. Saikia, *Iwasawa λ -invariants of p -adic measures on \mathbb{Z}_p^n and their Γ -transforms*, **Journal of Number Theory** 132 (2012), pp. 2258–2266.
7. R. Barman, *On p -adic Properties of Certain Mahler Coefficients*, **J. Ramanujan Math. Soc.** 26 (2011), no. 3, pp. 195–202.
6. R. Barman and A. Saikia, *Iwasawa λ -invariants and Γ -transforms of p -adic measures on \mathbb{Z}_p^n* , **Int. J. Number Theory** 6 (2010), no. 8, pp. 1819–1829.
5. R. Barman and A. Saikia, *A note on Iwasawa μ -invariants of Elliptic curves*, **Bull. Brazilian Math. Soc.** 41 (2010), no. 3, pp. 399–407.

4. R.Barman and N.D.Baruah, *Theta Function Identities Associated with Ramanujan's Modular Equations of Degree 15*, **Proc. Indian Acad. Sci. (Math. Sci.)** 120 (2010), no. 3, pp. 267–284.
3. R.Barman and A. Saikia, *Coefficients of a p -adic measure on \mathbb{Z}_p^n and Iwasawa lambda-invariant of its Gamma -transform*, **Asian Eur. J. Mathematics** 3 (2010), no. 4, pp. 545–554.
2. R. Barman and A. Saikia, *Iwasawa λ -invariants and Γ -transforms*, **J. Ramanujan Math. Soc.** 24 (2009), no. 2, pp. 199–209.
1. R.Barman and N.D.Baruah, *Certain Theta-function Identities and Ramanujan's Modular Equations of Degree 3*, **Indian J. Math.** 48 (2006), no. 1, pp. 113–133.

Research articles currently under review:

1. A note on Lin's conjecture on $\text{PDO}_t(n)$ (with Gurinder Singh).
2. On p -adic denseness of quotients of values of integral forms (with Deepa Antony and Stevan Gajovic)
3. On the p -adic valuation of third order linear recurrence sequences (with Deepa Antony)
4. A q -supercongruence from finite q -binomial theorem (with Sipra Maity)

Ph. D. students (completed):

1. **Dr. Gautam Kalita.**

Title of the Thesis: **Certain families of algebraic curves and polynomials, and their connections to hypergeometric series**
Thesis defended in February 2014 at Tezpur University.

Current position: Professor, Bhattadev University.

Positions held: Associate Professor, Indian Institute of Information Technology (IIIT) Guwahati (2014–2024).

2. **Dr. Neelam Saikia**

Title of the thesis: **Hypergeometric series in the p -adic setting, truncated hypergeometric series and supercongruences**
Thesis defended in April 2016 at IIT Delhi.

Current Positions: Assistant Professor, Indian Institute of Technology (IIT), Bhubaneswar.

Positions held: (1) Postdoctoral fellow at the University of Vienna, under Prof. Michael J. Schlosser (May 2022-December 2022).

(2) Nehru-Fulbright Postdoctoral Fellow, University of Virginia, USA (May 2021-May 2022), under Prof. Ken Ono.

(3) DST Inspire Faculty at IISc Bangalore and IIT Guwahati during October 2016-April 2021.

(4) Visiting Fellow, ISI Delhi during April 2016-September 2016.

3. **Dr. Chiranjit Ray**

Title of the thesis: **Arithmetic properties of certain partition functions and modular forms**

Thesis defended in May 2019

Current position: Assistant Professor (Grade-I), NIT Calicut.

Positions held: (1) Assistant Professor, IIIT Sri City, Andhra Pradesh.

(2) Post Doctoral Fellow, ISI Delhi (November 2021-October 2022)

(3) Post Doctoral Fellow, HRI, Allahabad during June 2019-October 2021.

4. **Dr. Nilanjan Bag**

Title of the thesis: **Some problems on exponential sums**

Thesis defended in December 2020

Current position: Assistant Professor, Thapar Institute of Engineering & Technology, Patiala.

Positions held: (1) Post Doctoral Fellow, HRI, Allahabad.

(2) NBHM Post Doctoral Fellow, RKMVERI, Belur Math, under Prof. Stephan Baier.

5. **Dr. Mohit Tripathi**

Title of the thesis: Appell series over finite fields and Gaussian hypergeometric series

Thesis defended in January 2021

Current position: Postdoctoral fellow at Texas Tech University, USA.

Previous Position: Research Associate, NISER Bhubaneswar (February 2021-July 2023).

6. **Dr. Ajit Singh**

Title of the thesis: Divisibility of certain partition functions and modular forms

Thesis defended in May 2022

Current position: Fulbright-Nehru Postdoctoral Scholar, University of Virginia, USA under Prof. Ken Ono.

Previous Position: Research Associate, IIT Guwahati (May 2022-August 2023)

7. **Dr. Anwita Bhowmik**

Title of the thesis: Paley and Peisert graphs over finite fields and their generalizations

Thesis defended in December 2023

Current position: Postdoctoral Scholar, Hebei Normal University, China under Prof. Goryainov Sergey.

Ph. D. students (ongoing)

1. Ms. Deepa Antony: Joined in January 2020
2. Mr. Gurinder Singh: Joined in July 2020
3. Ms. Sulakashna: Joined in July 2020
4. Mr. Subhrajyoti Bhattacharyya (NIT Agartala) (joint supervision)
5. Mr. Sipra Maity: Joined in January 2023
6. Mr. Alapan Ghosh: Joined in January 2023

Current Post doctoral fellows:

Former Post doctoral fellows:

3. **Dr. Ajit Singh** (Ph.D. from IIT Guwahati)
Research Associate, May 2022–August 2023.
2. **Dr. Zakir Ahmed** (Ph.D. from Tezpur University, Tezpur, Assam).
National Post Doctoral Fellow (NPDF), 2017-2018.
Current Position: Assistant Professor, Barnagar College, Sorbhog, Assam
3. **Dr. Sneha Bala Sinha** (Ph.D. from HRI, Allahabad.)
National Post Doctoral Fellow (NPDF), 2017-2018.

MTech project thesis:

1. Archit Sachdeva, *Partitions: Dyson and M_2 Rank Differences*, 2015-2016, IIT Delhi
2. Harsimran Singh, *Partitions: Warnaars Bijection and Colored Partition Identities*, 2015-2016, IIT Delhi

MSc project supervision:

1. Tamanna Jangid, Identification numbers and check digit schemes, Jan-April 2024 (IITG).
2. Arijit Pal, A study on algebraic numbers, Jan-April 2023 (IITG).
3. Ritwik Prabin Kalita, A study on algebraic numbers and algebraic integers, Jan-April 2022 (IITG)

4. Vandana Rao, Modular forms for $SL_2(\mathbb{Z})$, Jan-May 2022 (IITG)
5. Paromita Bordoloi, Rational points on elliptic curves, Jan-April 2021 (IITG)
6. Anuradha Kumari, A study on algebraic numbers, Jan-May 2020 (IITG)
7. Aishwarya Jaiswal, A study on p -adic numbers, Jan-May 2020 (IITG)
8. Abhinav Kumar Mishra, Irrationality of Zeta values and Apery numbers, Jan-May 2019 (IITG)
9. Subhrajyoti Bhattacharyya, Ramanujan's tau function, Jan-May 2019 (IITG)
10. Mrityunjoy Charan, Binary quadratic forms and primes of the form $p = x^2 + ny^2$, Jan-May 2018 (IITG)
11. Saikat Ghosh, Application of UFD in solving Diophantine equations, Jan-May 2018 (IITG)
12. Pratibha Gupta, Polynomials over finite fields, Jan-May 2017 (IITG)
13. Vishal Agarwal, Reciprocity Laws and their applications, 2015-2016 (IIT Delhi)
14. Vijayluxmi, A study on algebraic numbers, 2015-2016 (IIT Delhi)
15. Pradeep, q -series and partition, 2015-2016 (IIT Delhi)
16. Gaurav Seth, Modular Forms and partitions, 2015-2016 (IIT Delhi)
17. Aditi Gupta, Irreducible Polynomials over finite fields, 2014-2015 (IIT Delhi)
18. Soumen Sahoo, Gauss and Jacobi sums, 2014-2015 (IIT Delhi)
19. Kiran Nagarkoti and Punnet, Permutation polynomials over finite fields, 2014-2015 (IIT Delhi)
20. Ankita Sen and Hasanur Rahman, Algebraic and topological properties of p -adic numbers, 2014-2015 (IIT Delhi)

B. Tech project supervision:

1. G Yuvan Shankar, Study on seperable integer partitions, July 2023-May 2024
2. Shivam Saini, Some elementary partition inequalities and their implications, July 2023-May 2024
3. Meghna Barnwal and Dipika Agrawal, Arithmetic properties of certain partition functions, July 2022-May 2023.
4. Animesh Renanse (EEE, Samsung Fellow), Classical Algebraic Geometry and Applications in Cryptography, July 2021-May 2022
5. Ayaz Anis and Raunak Tiwari, A study on integer partitions, July 2021-May 2022
6. Mogillapalli Nikhil and Tumarada Aditya, A study on Paley Garphs, July 2020- May 2021
7. M. Siva Venkata Ranga Reddy and Pranav Jangir, A study on partition functions, July 19-May 2020
8. Seralathan V S (M&C) and Abhishek Tyagi (CSE), Mao's conjectures on Rank differences, July 2017-May 2018

In addition to the above, I supervised about 25 MSc projects during 2002–2012 at Tezpur University.

I supervised the following students under **Science Academies' Summer Research Fellowship Programme**

1. Mr. Varghese Babu, NISER Bhubaneswar (May-July 2013).
Title of project: A Study on Group Representation Theory

2. Mr. Tushar Bag, IIT Kanpur (May-July 2013).
Title of project: Cubic and Biquadratic Reciprocity
3. Ms. Geethanjali Nair, Pondicherry University (May-July 2014).
Title of project: Permutation Polynomials over Finite Fields
4. Ms. Ritika Gulati, IIT Delhi (May-July 2014).
Title of project: Galois Theory
5. Ms. Ramya P., Mangalore University (May-July 2017).
Title of project: Group of Symmetries
6. Mr. Rahul Gogoi, St. Anthony College, Shillong (May-July, 2020)
Title of project: A study on The Congruent Number Problem
7. Mr. Arpan Chandra Mazumder, University of Hyderabad (May-July, 2020)
Title of project: A study on cyclotomic number fields
8. Mr. Bibhash Kafle, a 2nd year MSc student from Tezpur University worked under me as an IASc-INSA-NASI Summer Research Fellow during July-August 2022.
9. Mr. Liton Karmakar, a 2nd year MSc student from Tezpur University worked under me as an IASc-INSA-NASI Summer Research Fellow during July-August 2022.
10. Mr. Ananyo Mondal, a 3rd year BS-MS student from IISER Berhampur worked under me as an IASc Summer Research Fellow during May-July 2023.
11. Ms. Shraddha Saha, a 3rd year BS-MS student from Tezpur University worked under me as an IASc Summer Research Fellow during June-August 2023.
12. Mr. Raj Paul, a 2nd year MSc student from Tezpur University worked under me as an IASc-INSA-NASI Summer Research Fellow during June-August 2024.
13. Saptarshi Dutta, a 3rd year BS-MS student from IISER Thiruvananthapuram (IISER TVM) worked under me as an IASc Summer Research Fellow during May-July 2024.

Conferences / Schools/ Invited Talks:

A. International:

1. Title of talk: p -Adic hypergeometric functions and certain weight three newforms.
Conference: International Conference on Lie Algebra and Number Theory (ICLANT-2024), NIT Calicut, June 9-14, 2024.
2. Title of talk: Some recent conjectures of Keith and Zanello on t -regular partitions.
Conference: International Conference on Special Functions and Applications (ICSFA-2022), Mysore University, November 26-28, 2022.
3. Title of talk: Lacunary eta-quotients and distribution of certain partition functions.
Conference: International Conference on Recent Trends in Mathematics 2021, Delhi University, December 22-24, 2021
4. Title of talk: Lacunary eta-quotients and distribution of certain partition functions.
Conference: International Conference on class groups of number fields and related topics, KSOM, October 21-24, 2021
5. Title of talk: On Mex-related partition functions of Andrews and Newman.
Conference: International Conference on Special Functions and Applications (ICSFA-2020)
6. Title of talk: On the parity of certain partition functions
Conference: International Webinar on Recent Developments in Number Theory, August 17-20, 2020

7. Title of talk: Iwasawa invariants of p -adic measures.
Conference: International Conference on class groups of number fields and related topics, HRI, October 16-19, 2019
8. Title of talk: On Andrews integer partitions with even parts below odd parts.
Conference: Journees Arithmetic 2019, held at Istanbul University, Turkey during July 1-5, 2019
9. Title of talk: Hypergeometric series in Arithmetic Geometry.
Conference: International Conference on Class Groups of Number Fields and Related Topics-2018, HRI, October 8-11, 2018.
10. Title of talk: p -adic analogues of Ramanujan π -series. Conference: 16th Annual conference on Srinivasa Ramanujan, Sastra-Ramanujan center, Kumbakonam, December 21-22, 2018
11. Title of talk: Counting points on Dwork hypersurfaces and hypergeometric functions
Conference: Journees Arithmetic 2017, held at University of Caen, France during July 3-7, 2017
12. Title of talk: Hypergeometric functions over finite fields, p -adic hypergeometric functions and algebraic curves. Conference: 29th International Conference of The Jangjeon Mathematical Society held at Pondicherry University during 08-10 August 2016.
13. Title of talk: Hypergeometric series in the p -adic setting
Conference: 29th Journées Arithmétiques held at University of Debrecen, Hungary, July 6-10, 2015.
14. Legacy of Ramanujan, held at the University of Delhi during Dec 17-22, 2012.
15. Pan Asian Number Theory Conference, held at IISER Pune, organized by International Center for Theoretical Sciences(ICTS) July 23-27, 2012.
16. Workshop on Bloch-Kato Conjectures, held at IISER Pune, organized by International Center for Theoretical Sciences(ICTS), July 17-21, 2012.
17. International Summer School on BSD Conjecture, Sardinia, Italy, June 26-July 3, 2011.
18. Delivered a talk on *Iwasawa lambda invariants of p -adic measures and their Gamma-transforms* at the Mathematical Institute, University of Heidelberg, Germany on 27th May 2011.
19. Title of talk: Iwasawa invariants of elliptic curves.
Conference: International Congress of Mathematicians (ICM), Hyderabad, August 19-27, 2010.
20. International Conference on Arithmetic Geometry, held at NCBS, Bangalore, organized by Tata Institute of Fundamental Research, Mumbai from March 23 to March 29, 2008.
21. Summer School in Iwasawa Theory, held at McMaster University, Ontario, Hamilton, Canada, from August 9 to August 13, 2007 and worked on a project entitled "*Q-sequences and Application to Elliptic Curves*" under the supervision of Prof. Robert Pollack.

B. National:

1. Delivered a talk titled "Primes in Number Theory" at Assam University, Silchar on March 14, 2024.
2. Delivered a talk titled "Distribution of primes" at Arya Vidyapeeth College, Guwahati on March 14, 2023.
3. Delivered two lectures at the Refresher Course on "Mathematical science and its applications" organized by Gauhati University during Feb 20-March 6, 2023.
4. Delivered a talk titled "Ramanujan and the partition function" at Pondicherry University on December 22, 2022.
5. Lecture series on Group Theory, Kohima Science College, Nagaland, October 6-7, 2022.

6. Delivered 12 lectures on Field Theory in AFS-III held at IIT Guwahati during June 20-July 16, 2022.
7. Delivered the Phanidhar Datta Memorial Lecture titled “Ramanujan and the Partition Function” on 17th March 2022 at Gauhati Univerzity.
8. Delivered two lectures at the Refresher Course on “Mathematics and Statistics” organized by Gauhati University during Jan 24-Feb 7, 2022.
9. Delivered a talk titled “On the parity of certain partition functions” at the National webinar on Recent Trends in Mathematics organized by the Department of Mathematics, Cotton University, August 18-19, 2021.
10. Delivered two lectures on Group Theory at the National Workshop on Mathematics, organized by USTM and IIT Guwahati, June 28-30, 2021.
11. Delivered six lectures on Group Theory at a training programme, Kohima Science College, April 15-16, 2021
12. Title of talk: Lacunary eta-quotients and distribution of certain partition functions
IMSc online number theory webinar, 19th February 2021
13. Title of talk: p -adic analogues of Ramanujan π -series and supercongruences.
National Workshop on Geometry of Continued Fractions: Ramanujan and his successors, 2020
14. Delivered a series of lectures at the Workshop on group theory, NIT Nagaland, December 2-6, 2019.
15. Title of talk: Arithmetic properties of certain partition functions and modular forms
Conference: Number Theory, Combinatorics and Special Functions (NTCSF2019), Thapar Institute of Engg. and Tech., October 11-12, 2019.
16. Delivered six lectures on Group Theory at the Training programme for Undergraduate students, IIT Guwahati, July 1-13, 2019.
17. Delivered six lectures on Group Theory at the Teachers’ Enrichment Course, IIT Guwahati, July 1-13, 2019.
18. Delivered eight lectures on Modular Forms at the AIS on Modular Forms, IIT Guwahati, May 13-June 1, 2019.
19. Delivered three talks at the Refresher Course on Mathematics at Gauhati University during December 26-29, 2018.
20. Title of talk: Hypergeometric series and modular forms.
Workshop: Workshop on Number Theory, NISER Bhubaneswar, December 3-6, 2018
21. Delivered a Colloquium talk titled Hypergeometric series in Arithmetic Geometry at ISI Kolkata on September 24, 2018.
22. Delivered a Colloquium talk titled Values of finite field hypergeometric series, IIT Delhi on May 15, 2018.
23. Delivered 8 lectures in the Instructional School on Algebraic Number Theory, IIT Guwahati, May 14-June 2, 2018.
24. Delivered two lectures in IST, Gauhati University during December 29-30, 2017.
25. Ishan Vikas, IIT Guwahati, December 2017.
26. MTTS, IIT Guwahati, May 29 to June 24, 2017. I delivered 12 lectures on Number Theory.
27. Delivered the Dr. Amala Bezbaruah memorial lecture on Elliptic curves in Number Theory at Gauhati University on March 15, 2017.

28. Title of talk: Hypergeometric series in Arithmetic Geometry.
Conference: National Conference on Recent Advances in Mathematics and Applications (RAMA 2017), Calcutta University, 1-2 March, 2017.
29. Title of talk: p -adic analogues of Ramanujan series for π and hypergeometric series
Conference: National Conference on Advances in Mathematical Sciences, Gauhati University, 22-23 December, 2016.
30. Delivered 6 lectures on Modern Algebra at the Teacher's Enrichment Workshop (TEW) held at IIT Guwahati during December 19–24, 2016.
31. Delivered 10 lectures on Hypergeometric Series in Arithmetic Geometry at the GIAN Course: The Influence of Ramanujan in Number Theory at Tezpur University during July 25 - August 6, 2016. Prof. Bruce C. Berndt of UIUC as the foreign speaker of the GIAN Course.
32. Delivered a series of three talks on *Divisors, Picard group, and point counting on Elliptic Curve over finite fields* at the workshop on Elliptic Curve Cryptography for the DRDO scientists during March 31 - April 8, 2015 at ISI Delhi.
33. Visited Harish-Chandra Research Institute (HRI) during July 6-11, 2014. Delivered a talk titled *Hypergeometric functions over finite fields and p -adic numbers* on 8th July 2014.
34. Delivered talks on various topics of Number Theory at the DST Inspire Science Camp organized by Sibsagar Girls' College during April 8-12, 2014.
35. Delivered an invited talk on Some Unsolved Problems in Number Theory at Sibsagar College on April 9, 2014.
36. Inaugural talk titled *Elliptic Curves in Number Theory* at the national annual fest INTEGRATION 2014, organized by St. Stephens College, New Delhi on 12th February 2014.
37. Invited talk titled *Hypergeometric functions over finite fields and trace of Frobenius of elliptic curves* at ISI, Delhi on 6th November 2013.
38. Invited talk titled *Elliptic Curves and Hypergeometric functions over finite fields* at the National Seminar Recent Trends in Mathematics and Application on 7th October 2013 at Digboi College, Assam.
39. Invited talk titled *Elliptic curves over finite fields* at SAG, DRDO, Delhi on 25th September 2013.
40. Delivered a series of four lectures on various topics of Number Theory at the UGC sponsored Refresher Course in Mathematics for College/University Teachers organized by the Department of Mathematics, North Eastern Hill University (NEHU) during April 5-7, 2012.
41. Tutor for the Advanced Training in Mathematics for Teachers (ATML) in Linear Algebra held at IIT Guwahati from July 3-17, 2010.
42. Advances in Mathematics: Focus on Women in Mathematics held at School of Physical Sciences, Jawaharlal Nehru University, New Delhi during October 5-7, 2009.
43. Advanced Training in Mathematics on Arithmetic Geometry held at IIT Guwahati from September 22 to 30, 2008.
44. p -Adic Semester at School of Mathematics, Tata Institute of Fundamental Research Mumbai from July 23 to August 30, 2008. During my stay at TIFR, I worked under the supervision of Prof. R. Sujatha.
45. Galois Representations and Modular Forms: Workshop in Arithmetic Geometry held at Chennai Mathematical Institute, Chennai, India from September 24 to October 05, 2007.
46. 21st Annual Conference of Ramanujan's Mathematical Society held at the Department of Mathematics and Statistics, University of Hyderabad from July 3 to July 8, 2006. I presented the paper *Theta Function Identities Associated with Ramanujan's Modular Equations of Degree 15*.

Workshop/Conference organized:

I have been organising training camps and workshops (funded by National Board for Higher Mathematics, DST and National Center for Mathematics) since 2010.

1. Organizing Secretary of “38th Annual Conference of Ramanujan Mathematical Society”, December 22-24, 2023.
2. Workshop on Jacobi Forms (funded by NCM), December 12-24, 2022
3. Annual Foundation School (AFS)-III (funded by NCM), June 20-July 16, 2022
4. Online workshop on Modular Forms (funded by NCM), December 14-19, 2020
5. Alumni Symposium on Mathematics and Computing, Department of Mathematics IITG, September 19-20, 2020
6. Advanced Instructional School (AIS) on Modular Forms (Funded by NCM), May 13-June 1, 2019
7. Advanced Instructional School (AIS) on Algebraic Number Theory (Funded by NCM), May 14-June 2, 2018
8. Annual Foundation School (AFS-I) held at IIT Guwahati during December 1-28, 2016
9. NBHM sponsored Winter School on Galois Theory during December 12-15, 2012.
10. NBHM and DST sponsored Winter School and Conference on Algebra and Number Theory during December 23-29, 2011
11. NBHM and DST sponsored Workshop on Algebra and Number Theory during December 22-26, 2010.

Teaching: (1) IIT Guwahati (July 2016–June 2023): I taught the following courses.

1. MA 726: Number Theory (2023)
2. MA 521: Modern Algebra (2017, 2020, 2023)
3. MA 622: Galois Theory (2018, 2019)
4. MA 627: Modular Forms (2019, 2020)
5. MA 509: Algebraic Number Theory (2018, 2023, 2024)
6. MA 621: Rings and Modules (2020)
7. MA312M: Modern Algebra (2021)
8. MA 222: Elementary Number Theory and Algebra (2022)
9. MA001: Preparatory Mathematics-I (2016)
10. MA 102: Mathematics-II (2017, summer-2017)
11. MA 101: Mathematics-I (2019, 2021)
12. MA 222: Elementary Number Theory and Algebra (2022, 2024)

(2) IIT Delhi (May 2013–June 2016): I taught the following courses.

1. MAL 705: Discrete Mathematical Structures (2013)
2. MAL 111: Introduction to Analysis and DE (2013)
3. MTL 100: Calculus (2014, 2015, 2016)

4. MTL 180: Discrete Mathematical Structures (2014, 2015, 2016)
5. MAL 863: Algebraic Number Theory (2014, 2015)
6. MAL 738: Commutative Algebra (2016)
7. MAL 735: Number Theory (2015)

(3) Tezpur University (October 2002–April 2013): I taught the following courses.

- B. Tech: Mathematics I, Mathematics II
- Integrated M. Sc.: Mathematics I, Mathematics II, Modern Algebra, Linear Algebra, Differential Equations
- M. Sc.: Modern Algebra, Advanced Algebra, Complex Analysis, Measure Theory, Algebraic Number Theory, Elliptic Curves, Linear Algebra, Number Theory, Graph Theory, Real Analysis

Administrative Responsibilities:

1. Associate Dean of Academic Affairs (undergraduate), May 2023 onwards
2. Member of the National Committee of NCM for IST for 2021-2024.
3. Member of the National Committee of NCM for TEW for 2021-2024.
4. Department Representative for Institute Research and Development Committee since September 2022.
5. Member, DPPC, Department of Mathematics, IIT Guwahati, January 2022-January 2024
6. Member, Institute Lecture Series Committee for 2016-2019. I invited Professor Ken Ono of University of Virginia and organised a public lecture in December 2019.
7. Member Secretary, DPPC, Department of Mathematics, IIT Guwahati, January 2020-January 2022.
8. Member, DPPC, Department of Mathematics, IIT Guwahati, January 2018-January 2020
9. Faculty Advisor of MSc 2017–2019 Batch, Departmental of Mathematics, IIT Guwahati.
10. Member, Departmental Disciplinary Committee, January 2019-till date
11. Professor Ken Ono joined the Department of Mathematics, IIT Guwahati as an Honorary Professor on July 1, 2023 for a period of two years as a second term. His first term as an Honorary Professor ended in October 2022. During the first term (2020-2022), Prof. Ken Ono offered an advanced course (online) on Number Theory for our PhD students. He also gave a few seminars online for our students and faculty members. Our PhD students interacted with him on different research problems. His association with the department has been extremely helpful for the PhD students working on Number Theory and Algebra. I am the faculty from the Department associated with Prof. Ken Ono to establish academic collaborations.
12. Member Secretary Departmental Faculty Board, Departmental of Mathematics, IIT Delhi, 2014–2015 (2 years).

Other Academic Responsibilities: I have served as referee for research articles for the following journals

1. Advances in Mathematics
2. Journal of Number Theory
3. Pacific Journal of Mathematics
4. Proceedings of the London Mathematical Society
5. Proceedings of the American Mathematical Society

6. Proceedings of the National Academy of Sciences, USA
7. Finite Fields and Their Applications
8. Journal of Combinatorial Theory, Series A
9. Journal für die reine und angewandte Mathematik (Crelle's Journal)
10. European Journal of Combinatorics
11. Electronic Journal of Combinatorics
12. International Journal of Number Theory
13. Journal of Mathematical Analysis and Applications
14. Research in Number Theory
15. Results in Mathematics
16. Annals of Combinatorics
17. The Ramanujan Journal
18. Science China Mathematics
19. Discussiones Mathematicas and Graph Theory
20. Research in Mathematical Sciences
21. Bulletin of the Australian Math. Soc.
22. Proceedings of the Edinburgh Mathematical Society
23. Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM
24. Rocky Mountain Journal of Mathematics
25. Open Mathematics (De Gruyter)
26. Journal of Analysis
27. Involve
28. Notes on Number Theory and Discrete Mathematics
29. Electronic Research Archive
30. Thai Journal of Mathematics
31. Journal of Difference Equations and Applications
32. Boletim da Sociedade Paranaense de Matematica
33. SIGMA: Symmetry, Integrability and Geometry: Methods and Applications
34. Journal of Integer Sequences
35. INTEGERS: Electronic J. Combinatorial Number Theory
36. Proceedings - Mathematical Sciences, Indian Academy of Sciences
37. Journal of Ramanujan Mathematical Society
38. Proceedings of Jangjeon Mathematical Society, South Korea
39. Indian Journal of Pure and Applied Mathematics

40. Palestian Journal of Mathematics
41. Journal of the Indian Mathematical Society
42. Far East Journal of Mathematics
43. Proceedings of the National Academy of Sciences, India Section A: Physical Sciences
44. Journal of Assam Academy of Mathematics
45. Mathematical Reviews (MR) and Zentralblatt MATH.

I have evaluated PhD thesis of the following Universities/Institutes.

1. IISc Bangalore
2. IISER Berhampur
3. IIT Roorkee
4. IIT Patna
5. IIT Gandhinagar
1. BITS, Pilani
6. Tezpur University
7. North Eastern Hill University (NEHU)
8. Manipur University
9. Mysore University
10. Central University of Jharkhand
11. Thapar Institute of Engineering and Technology
12. Sambalpur University
13. Rajiv Gandhi University, Itanagar

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