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## Brundaban Sahu

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### Personal:

- Date of Birth : January 02, 1978
- Place of Birth : Jharanipali, Balangir
- Nationality : Indian

### Research Interests:

- Number Theory, Modular Forms, Jacobi Forms

### Education:

- Ph.D. in Mathematics, Harish-Chandra Research Institute/ University of Allahabad, 2008  
Thesis Title: *Some Problems in Number Theory*,  
Advisor : Professor B. Ramakrishnan.
- M. Sc. in Mathematics (83.8 %), Sambalpur University, 2001.
- B. Sc. in Mathematics (75.5 %), G. M. College, Sambalpur, 1999.
- Higher Secondary (66.7 %), G. M. College, Sambalpur, 1996.
- Secondary (77.2 %), I. G. High School, Jharanipali, Balangir, 1994.

### Employment:

- Reader-F (July 1, 2014–), NISER, Bhubaneswar
- Assistant Professor (August 2, 2010–June 30, 2014), NISER, Bhubaneswar
- Science Foundation of Ireland (SFI) Postdoctoral Fellow  
(November 2008– October 2010), University College Dublin  
Postdoctoral Advisor: Professor Dr. Robert Osburn
- Junior/ Senior Research Fellow (2002–2008), HRI, Allahabad.

### Publications/ Preprints:

- (1) Rankin-Cohen brackets on Jacobi forms of several variables and special values of certain Dirichlet series (with Abhash Kumar Jha)
- (2) On the number of representations by certain quadratic forms in 8 variables (with B. Ramakrishnan and Anup Kumar Singh)
- (3) Differential operators on Jacobi forms and special values of certain Dirichlet series (with Abhash Kumar Jha)
- (4) Rankin-Cohen brackets on Hilbert modular forms and special values of certain Dirichlet series (with Moni Kumari) Accepted in Funct. Approx. Comment. Math
- (5) On the number of representations of certain quadratic forms and a formula for the Ramanujan Tau function with B. Ramakrishnan and Anup Kumar Singh Accepted in Funct. Approx. Comment. Math
- (6) On the number of representations of certain quadratic forms and a formula for the Ramanujan Tau function (with B. Ramakrishnan and Anup Kumar Singh) To appear in in Geometry, Algebra, Number Theory and Their Information Technology Applications (GANITA) in honor of Professor V. Kumar Murty, Springer Proceedings in Mathematics and Statistics
- (7) On the number of representations by certain octonary quadratic forms with coefficients 1, 2, 3, 4 and 6 (with B. Ramakrishnan and Anup Kumar Singh) To appear in International Journal Number Theory
- (8) On the representations of a positive integer by certain classes of quadratic forms in eight variables (with B. Ramakrishnan and Anup Kumar Singh) To appear in Analytic Number Theory, Modular Forms and q-Hypergeometric Series in honor of Professor K. Alladi, Springer Proceedings in Mathematics and Statistics
- (9) On the number of representations of certain quadratic forms in 20 and 24 variables, Funct. Approx. Comment. Math. 54 (2016), 2, 151-161 (with B. Ramakrishnan)
- (10) Rankin-Cohen brackets on Siegel modular forms and Special values of Certain Dirichlet series, The Ramanujan Journal, 44 (2017), 1, 63-73 (with Abhash Kumar Jha)
- (11) Rankin-Cohen brackets on Jacobi Forms and the adjoint of some linear maps, The Ramanujan Journal, 39 (2016), 3, 533-544 (with Abhash Kumar Jha)

- (12) *Evaluation of convolution sums and some remarks on cusp forms of weight 4 and level 12* Mathematical Journal of Okayama University, 59 (2017), 71-79 (with B. Ramakrishnan)
- (13) *Identities for the Ramanujan Tau function and certain convolution sum identities for the divisor functions*, Number Theory, RMS-Lecture Notes Series, No. 23, 2016, 63-75 (with B. Ramakrishnan)
- (14) *Supercongruences for Sporadic Sequences* Proceedings of the Edinburgh Mathematical Society (Series 2), 59 (2016), 2, 503-518 (with R. Osburn, A. Straub)
- (15) *On the number of representations of an integer by certain quadratic forms in sixteen variables* Int. J. Number Theory, 10 (2014), 8, 1929- 1937 (with B. Ramakrishnan),
- (16) *Evaluation of the convolution sums  $\sum_{l+15m=n} \sigma(l)\sigma(m)$  and  $\sum_{3l+5m=n} \sigma(l)\sigma(m)$  and an application*, Int. J. Number Theory, 9 (2013), 3, 799- 809 (with B. Ramakrishnan) .
- (17) *A supercongruence for generalized Domb numbers*, Funct. Approx. Comment. Math., 48 (2013), 1, 29-36 (with R. Osburn).
- (18) *Supercongruences for Apéry-like numbers* (with R. Osburn), Advances in Applied Mathematics, 47, (2011), no. 3, 631-638 .
- (19) *Congruences via Modular forms* (with R. Osburn), Proc. Amer. Math. Soc., Vol 139 (2011), no. 7, 2375-2381.
- (20) *Rankin-Cohen Brackets and van der Pol-Type Identities for the Ramanujan's Tau Function* (with B. Ramakrishnan), arXiv:0711.3512v1.
- (21) *Rankin's method and Jacobi forms of several variables* (with B. Ramakrishnan), Journal of Australian Math. Soc., 88 (2010), no. 1, 131-143.
- (22) *Distribution of Residues Modulo  $p$*  (with S. Gun, F. Luca, P. Rath, R. Thangadurai), Acta Arith. 129 (2007), no. 4, 325-333.
- (23) *On the Fourier expansion of Half Integral weight Jacobi Forms* (with B. Ramakrishnan), Int. J. Math. Math. Sci., 2006, Art. ID 14726.
- (24) *Distribution of Quadratic non-residues which are not primitive roots* (with S. Gun, R. Thangadurai, B. Ramakrishnan), Math. Bohem., 130 (2005), no. 4, 387-396.

### Research Visits:

- University College Dublin, Dublin (June 5-9, 2017)

- Harish-Chandra Research Institute, Allahabad (September 26–October 1, 2016, June 29–July 9, 2015, September 23–October 4, 2013, 2012 December 9–15, 2012, July 9–20, 2012, December 12–23, 2011)
- University College Dublin, Dublin (July 9–23, 2011)
- Institut des Hautes Études Scientifiques (IHÉS), Paris (July 15– September 15, 2009)

### **Research Grant(s):**

- Title: Modular forms and Supercongruences (SR/FTP/MS-053/2012)  
Funding Agency: SERB, Department of Science and Technology  
Period: 2014–2017, Rs 12, 24, 000/

### **Advising:**

- Mr. Abhash Kumar Jha (Ph.D. 2016, NISER)
- Ms. Moni Kumari (Ph. D., 2014– on progress, NISER)
- Mr. Akash Jena (M. Sc. Thesis, 2017, NISER)
- Mr. Sagar Srivastava (M. Sc. Thesis, 2016, NISER)
- Mr. Ankush Goswami (M. Sc. Thesis, 2013, NISER)
- Ms. Sneha Chaubey (M. Sc. Thesis, 2012, NISER)

### **Summer Students (Indian Academy of Sciences) Guidance:**

- Brahadeesh Sankaranarayanan, IISER, Bhopal, 2016
- Amitayush Thakur, BITS, Pilani, 2015
- Brahadeesh Sankaranarayanan, IISER, Bhopal, 2015
- Aneesh Palsule, IISER, Bhopal, 2014
- Sambit Mohanty, St. Stephen's College, New Delhi, 2014
- Sujeet Kumar, Patna College, 2013
- Arpita Jena, ISM, Dhanwad, 2013

### **Talks in International Conferences/Workshops:**

- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, XXXmes Journes Arithmtiques, (July 3–7, 2017), University de Caen, France
- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, Combinatorics and Number Theory Meet, (February 19–23, 2017), Harish-Chandra Resaerch Institute, Allahabad

- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, INSA Annual Meeting (December 28–30, 2016), NISER, Bhubaneswar
- **On congruences on Apéry-like numbers**, International Conference on Number Theory (August 17-21, 2016), Kerala School of Mathematics, Kozhikode, India
- **Convolution sums of the divisor function and the number of representations of certain quadratic forms**, 3rd EU-US Workshop on Automorphic forms (March 18-22, 2016) University of Sarajevo, Bosnia and Herzegovina.
- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, Symposium on Number Theory, Ramanujan Mathematical Society Annual Conference, Tiruchirapalli (June 17–21, 2016), India
- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, Workshop on Automorphic forms (February 10-16, 2016), Kerala School of Mathematics, Kozhikode, India
- **Convolution sums of the divisor function and the number of representations of certain quadratic forms**, 30th Annual Workshop on Automorphic Forms and Related Topics (March 7-10, 2016) Wake Forest University, Winston-Salem, USA.
- **Rankin-Cohen brackets on Siegel modular forms and certain Dirichlet series**, Workshop on Automorphic forms (February 10-16, 2016), Kerala School of Mathematics, Kozhikode, India
- **Jacobi Cusp Forms and the adjoint of linear maps constructed with the Rankin-Cohen brackets**, 29th Annual Workshop on Automorphic Forms and Related Topics (March 2-5, 2015) University of Michigan, Ann Arbor, USA.
- **Construction of Jacobi cusp forms**, International conference on Automorphic forms and applications (February 13-14, 2015), Kerala School of Mathematics, Kozhikode, India
- **Supercongruences of Apéry-like numbers via modular forms**, International Conference on Automorphic forms and Number Theory, August 30-September 3, 2013, KSOM, Kerala
- **Quasimodular forms and Evaluation of certain convolution sums of divisor functions**, Contributed talk at The Legacy of Srinivasa Ramanujan, (December 17-22, 2012), University of Delhi, India

- **Differential operators on modular forms and quasimodular forms and some applications**, School on Modular Forms (October 3-19, 2012), Kerala School of Mathematics, Kozhikode, India
- **Congruences of Apéry-like numbers via modular forms**, 26th Automorphic Forms Workshop (April 26-29, 2012), University of British Columbia, Vancouver, Canada
- **Rankin-Cohen brackets on quasimodular forms and some applications**, Summer School on Quasimodular Forms (June 20-26, 2010) Clermont-Ferrand, France.
- **Differential operators on modular forms**, Workshop on the theory of Jacobi forms and Siegel modular forms, (November 23- December 5, 2009), Chennai, India.
- **Congruences for Apéry-like numbers**, XXVI Journées Arithmétiques (July 6-10, 2009) in Saint-Étienne, France
- **Rankin-Cohen Brackets and van der Pol type identities for the Ramanujan Tau function**, 23rd Annual Workshop on Automorphic Forms and Related Topics (May 10-13, 2009) Bucknell University, USA.
- **Hilbert Modular Forms**, Workshop on Arithmetic Geometry (Sept 24-Oct 05, 2007) in Chennai Mathematical Institute, Chennai, India.
- **On the Rankin-Cohen Brackets for Jacobi forms of higher degree**, Jacobi Forms and Applications (May 7-11, 2007) CIRM, Luminy, France.
- **On the Rankin-Cohen Brackets for Jacobi forms of higher degree**, International Conference on Number Theory and Applications (Dec 27-29, 2006) in RKM Vivekananda College, Chennai.
- **On the Fourier expansion of Jacobi forms of half-integral weights**, International Conference on Number Theory (Dec 1-5, 2006) in HRI, Allahabad

### Seminar Talks:

- **Rankin-Cohen Brackets on Quasimodular forms and Convolutions sums of the divisor functions**, (March 20, 2012), NISER, Bhubaneswar.
- **Representations of integers as sums of squares and modular forms**, (March 17, 2012), UGC aided Seminar, F. M. College, Balasore.
- **Differential operators on modular forms**, (December 16, 2009) NISER, Bhubaneswar.
- **Rankin-Cohen Brackets and van der Pol type identities for the Ramanujan Tau function**, (February 4, 2009), K-Theory, Quadratic Forms and Number Theory Seminar, UCD.

- **Some problems in number theory**, Thesis Seminar, University of Allahabad.
- **Some prime producing polynomials and class number**, (July, 2004), HRI, Allahabad
- **van der Waerden's Theorem and its applications**, (July, 2004), HRI, Allahabad.
- **Quadratic reciprocity law**, (December, 2002), HRI, Allahabad.

### **Conferences/Workshops Attended:**

- **Indefinite Theta functions and Applications in Physics and Geometry** (June 6–9, 2017), Hamilton Mathematics Institute, Trinity College Dublin, Ireland
- **Workshop on Bianchi Modularity** (July 11-15, 2013), University of Luxembourg, Luxembourg
- **Advanced School and Workshop on L-functions and modular forms** (September 1-12, 2014), ICTP, Trieste, Italy
- **Conference on Analytic Theory of Automorphic Forms** (December 9-13, 2013), IMSc, Chennai, India
- **International Conference on Automorphic forms and Number Theory** (August 30- September 3, 2013), KSOM, Kerala
- **The Legacy of Srinivasa Ramanujan**, (December 17-22, 2012), University of Delhi, India
- **School on Modular Forms** (October 3-19, 2012), Kerala School of Mathematics, Kozhikode, India
- **26th Automorphic Forms Workshop** (April 26-29, 2012), University of British Columbia, Vancouver, Canada
- **International Colloquium on Automorphic Representations and L-functions** (Jan 3-12, 2012), TIFR, Mumbai, India
- **International meeting on Number Theory** (Dec 15-20, 2011), HRI, Allahabad
- **School and Conference on Modular Forms and Mock Modular Forms and their applications in Arithmetic, Geometry and Physics** (Feb 28-March 18, 2011), ICTP, Italy
- **Prospects in q-series and modular forms** (July 14-16, 2010) UCD, Dublin, Ireland.
- **Summer School on Quasimodular Forms** (June 20-26, 2010) Clermont-Ferrand, France.

- **Workshop on the theory of Jacobi forms and Siegel modular forms** (November 23- December 5, 2009), Chennai, India
- **XXVI Journées Arithmétiques** (July 6-10, 2009) Saint-Étienne, France
- **Activités Additives et Analytiques** (June 30- July 4, 2009), Lille, France
- **Mock theta functions and applications in combinatorics, algebraic geometry, and mathematical physics** (May 25-29, 2009) Max Planck Institute for Mathematics, Bonn, Germany
- **UCD-Nottingham Number Theory Day** (May 2, 2009), University of Nottingham, UK
- **23rd Annual Workshop on Automorphic Forms and Related Topics** (March 10-13, 2009), Bucknell University, USA
- **International Colloquium on Cycles, Motives and Shimura Varieties** (Jan 3-12, 2008), TIFR, Mumbai, India
- **Workshop on Arithmetic Geometry** (Sept 24-Oct 05, 2007), Chennai Mathematical Institute, Chennai, India
- **Jacobi Forms and Applications** (May 7-11, 2007), CIRM, Luminy, France
- **School and Conference on Analytic Number Theory** (April 23-May 04, 2007), ICTP, Italy
- **International Conference on Number Theory and Cryptography** (Feb 23-27, 2007), HRI, Allahabad
- **International Conference on Number Theory and Applications** (Dec 27-29, 2006), RKM Vivekananda College, Chennai
- **International Conference on Number Theory** (Dec 1-5, 2006), HRI, Allahabad
- **India-UK Number Theory Conference** (Sept 18-23, 2006), IMSc, Chennai
- **AMS-INDIA Conference** (December 17-20, 2003), IISc, Bangalore

### Teaching:

- M205 (Linear algebra), Spring 2017, NISER.
- M101 (Mathematics-I), Fall-2016, NISER.
- M458 (Algebraic Number Theory), Spring-2016, NISER.
- M601 (Algebra-I, Ph.D.), Fall-2015, NISER.
- M560 (Modular Forms of one variable), Spring-2015, NISER.
- M302 (Algebra-III), Fall-2014, NISER.
- M307 (Algebra-IV), Spring-2014, NISER.
- M601 (Algebra-I, Ph.D.), Fall-2013, NISER.



- M307 (Algebra-IV), Spring-2013, NISER.
- M461 (Commutative Algebra), Fall-2012, NISER.
- M601 (Algebra-I, Ph.D.), Fall-2012, NISER.
- M459/M605 (Algebraic Topology), Spring-2012, NISER.
- M601 (Algebra -I, Ph.D.), Fall-2011, NISER.
- M202 (Algebra-I), Fall-2011, NISER.
- ME601/ME801 (Commutative Algebra), Spring-2011, NISER.
- M501 (Topology), Fall-2010, NISER.
- MATH 20160 (Polynomial Rings and Group Theory), Spring-2009, University College Dublin.

#### **Involvement in other activities:**

- Member, Library Advisory Committee, NISER (2012–)
- Convenor, PGCS (SMS), NISER (2013-14)
- External Reviewer for a Discovery grant proposal for Natural Science and Engineering Research Council of Canada (NSERC) 2013-14
- Referee for Journals
- Reviewer for AMS Mathematical Review (7 Reviews)

#### **Outreach Program:**

- Speaker at Summer Outreach Program in Mathematics, NISER, Bhubaneswar (June 2017)
- Speaker at Summer Outreach Program in Mathematics, NISER, Bhubaneswar (June 2016)
- Speaker at Summer Outreach Program in Mathematics, NISER, Bhubaneswar (June 2015)
- Speaker at Annual Foundation School-I, NISER, Bhubaneswar (December 1-27, 2013)
- Speaker at Rural Mathematics Olympiad/ Rural Mathematics Talent Search/ Junior Mathematics Olympiad/ Regional Mathematics Olympiad Programme in Odisha organised by IMA, Bhubaneswar (2010, 2011, 2012, 2013, 2014)
- Speaker at Teacher's Enrichment Workshop on Complex Analysis, Vivekananda College, Burdwan (December 27-31, 2013) "Complex Analysis in Number Theory"
- Speaker at Workshop in Excitement in Physics (June 2013), North Orissa University, Baripada. "Symmetry"

- Speaker at Sessions for Mathematics Olympiad Students, UCD, Dublin (2009, 2010)
- Speaker at Interactive Mathematics Training Camp (2006, 2007), Regional Institute of Education, Bhubaneswar (sponsored by NBHM), organised by Institute of Mathematics and Applications, Bhubaneswar.

**References:**

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