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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:

- Associate Professor (July 1, 2017–), NISER, Bhubaneswar
- Reader-F (July 1, 2014-June 30, 2017), 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 type operators for Hilbert-Jacobi forms*, (with Moni Kumari)
- (2) *Certain quaternary quadratic forms of level 48 and their representation numbers*, (with B. Ramakrishnan and Anup Kumar Singh)
- (3) *Rankin-Cohen brackets on Jacobi forms of several variables and special values of certain Dirichlet series* (with Abhash Kumar Jha)
- (4) *On the number of representations by certain quadratic forms in 8 variables* (with B. Ramakrishnan and Anup Kumar Singh)
- (5) *Differential operators on Jacobi forms and special values of certain Dirichlet series* (with Abhash Kumar Jha)
- (6) *Rankin-Cohen brackets on Hilbert modular forms and special values of certain Dirichlet series* (with Moni Kumari) Accepted in *Funct. Approx. Comment. Math*
- (7) *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*
- (8) *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 *Geometry, Algebra, Number Theory and Their Information Technology Applications (GANITA) in honor of Professor V. Kumar Murty*, Springer Proceedings in Mathematics and Statistics
- (9) *On the number of representations by certain octonary quadratic forms with coefficients 1, 2, 3, 4 and 6*, *Int. J. Number Theory*, 14 (2018), 3, 751- 812 (with B. Ramakrishnan and Anup Kumar Singh)
- (10) *On the representations of a positive integer by certain classes of quadratic forms in eight variables* (with B. Ramakrishnan and Anup Kumar Singh) pp 641-664, In: Andrews G., Garvan F. (eds) *Analytic Number Theory, Modular Forms and q-Hypergeometric Series*. ALLADI60 2016. Springer Proceedings in Mathematics & Statistics, vol 221. Springer, Cham
- (11) *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)
- (12) *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)

- (13) *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)
- (14) *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)
- (15) *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)
- (16) *Supercongruences for Sporadic Sequences* Proceedings of the Edinburgh Mathematical Society (Series 2), 59 (2016), 2, 503-518 (with R. Osburn, A. Straub)
- (17) *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),
- (18) *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) .
- (19) *A supercongruence for generalized Domb numbers*, Funct. Approx. Comment. Math., 48 (2013), 1, 29-36 (with R. Osburn).
- (20) *Supercongruences for Apéry-like numbers* (with R. Osburn), Advances in Applied Mathematics, 47, (2011), no. 3, 631-638 .
- (21) *Congruences via Modular forms* (with R. Osburn), Proc. Amer. Math. Soc., Vol 139 (2011), no. 7, 2375-2381.
- (22) *Rankin-Cohen Brackets and van der Pol-Type Identities for the Ramanujan's Tau Function* (with B. Ramakrishnan), arXiv:0711.3512v1.
- (23) *Rankin's method and Jacobi forms of several variables* (with B. Ramakrishnan), Journal of Australian Math. Soc., 88 (2010), no. 1, 131-143.
- (24) *Distribution of Residues Modulo  $p$*  (with S. Gun, F. Luca, P. Rath, R. Thangadurai), Acta Arith. 129 (2007), no. 4, 325-333.
- (25) *On the Fourier expansion of Half Integral weight Jacobi Forms* (with B. Ramakrishnan), Int. J. Math. Math. Sci., 2006, Art. ID 14726.
- (26) *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):**

- MATRICS (MTR/2017/000228)  
Funding Agency: SERB, Department of Science and Technology  
Period: 2018-2021, Rs 6, 60, 000/
- 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 Hilbert modular forms and special values of certain Dirichlet series**, Discussion meeting on Modular Forms (February 12–24, 2018), KSOM, Calicut

- **Rankin-Cohen brackets on Hilbert modular forms and special values of certain Dirichlet series**, Conference on Number Theory: Arithmetic, Diophantine and Transcendence (December 22-25, 2017), IIT, Ropar
- **Rankin-Cohen brackets on Jacobi forms and Siegel modular forms and certain Dirichlet series**, XXXmes Journées Arithmétiques, (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 Research 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:

- **GIAN course "Transcendental Numbers and Special values of Dirichlet Series"** (December 16–21, 2017), IIT, Ropar
- **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:**

- M402: Representations of Finite Groups, Spring 2018, NISER
- M463: Finite Fields, Fall 2017, NISER
- 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:**

Prof. B. Ramakrishnan  
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