RAJAT GUPTA

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EDUCATION AND EMPLOYEMENT

Postdoctoral research scholar, University of Texas at Tyler, USA   2023–
Advisor: Prof. Madeline Dawsey

Postdoctoral research scholar, Institute of Mathematics, Academia Sinica, Taiwan   2022
Advisors: Prof. Miranda Cheng and Prof. John F. R. Duncan

Ph.D. Mathematics, Indian Institute of Technology Gandhinagar, India   2016–2021
Advisor: Prof. Atul Dixit
Thesis title: Koshliakov zeta functions, squares of odd zeta values, sum-of-tails identities, and mock theta functions.

RESEARCH VISITS

Visiting Research Scholar   Jan 2020 - June 2020
University of Illinois at Urbana-Champaign   *Urabana-Champaign, IL*
Advisor: Professor Bruce C. Berndt

RESEARCH INTEREST

- Analytic Number Theory
- Modular Forms, Jacobi Forms, and Mock Modular Forms
- Special Functions
- Theory of Partitions, q-series

PUBLICATIONS

1. Extended higher Herglotz functions II (with R. Kumar), J. Math. Anal. Appl. 518 (2023), no. 2, Paper No. 126720, 16 pp.

2. Two general series identities involving modified Bessel functions and a class of arithmetical functions (with Bruce C. Berndt, A. Dixit, and A. Zaharescu), accepted for publication at Can. J. Math (September 2022).

3. A class of identities associated with Dirichlet series satisfying Hecke's functional equation (with Bruce C. Berndt, A. Dixit, A. Zaharescu), Proc. Amer. Math. Soc. 150 (2022), pp. 4785-4799.

4. Ramanujan and Koshliakov meet Abel and Plana (with Bruce C. Berndt, Atul Dixit, and A Zaharescu), to appear in proceedings of M.V. Subbarao Centennial volume, (2022).

5. Koshliakov zeta functions I: Modular Relations (with A. Dixit), Adv. Math. 393 (2021), Paper No. 108093, 44 pp.

6. Generalizations of the Andrews-Yee identities associated with the mock theta functions $\omega(q)$ and $\nu(q)$ (with Bruce C. Berndt and Atul Dixit), J. Algebraic Combin. (2021), 32 pp.

7. On sum-of-tails identities, J. Combin. Theory Ser. A 184 (2021) Paper No. 105521.

8. On some q-series identities related to generalized divisor function and their implications (with Rahul Kumar), Discrete Math. 344 (2021) no. (11). Paper No. 112559.

9. Generalized Lambert series, Raabe's cosine transform and a generalization of Ramanujan's formula for $\zeta(2m+1)$ (with Atul Dixit, Rahul Kumar, and Bibekananda Maji), Nagoya Mathematical Journal. 239 (2020), 232-293.

10. On squares of odd zeta values and analogues of Eisenstein series (with Atul Dixit), Advances in Applied Mathematics, 110 (2019), 86-119.

PREPRINTS

1. Non-standard binary representations and the Stern sequences, (with Katie Anders, Madeline L. Dawsey, and Joseph Vandehey), submitted for publication (August 2023)

2. A segment of an Euler product of a certain Dirichlet series (with Aditi Savalia) (April 2023).

3. A note on odd zeta values over any number field and Extended Eisenstein series (with Soumyarup Banerjee and Rahul Kumar), submitted for publication (April 2023).

4. On a certain divisor function in number fields, (with S. Pandit), submitted for publication (September, 2022).

5. Extended higher Herglotz functions I. Functional equation, (with A. Dixit, and, R. Kumar), submitted for publication (July, 2021).

GRANTS AND FELLOWSHIPS

- AMS-Simons Travel Grant   July 2023 – June 2025
- CSIR/UGC Junior Research Fellowship (**Not Availed**)   July 2016 – July 2021
- GATE Fellowship   January 2017 – December 2021
- IIT JAM (Joint Admission test for Masters in Mathematics): All India rank 50.   2013

ACADEMIC DUTIES

- Co-organizing the UT Tyler Number Theory and Combinatorics Seminar   Fall 2023
- Organizing team for "A two-day symposium in number theory" at IIT Gandhinagar   December 2019

TEACHING

University of Texas at Tyler, USA

- Math 5331, Graduate Algebra (Graduate Course)   Fall 2023
- Math 2312, Pre calculus (Undergraduate Course)   Fall 2023
- Math 2312, Pre calculus (Undergraduate Course)   Summer 2023
- MATH-1342 Statistics (Undergraduate Course)   Spring 2023
- MATH-0303 Intermediate Algebra (Undergraduate Course)   Spring 2023

Indian Institute of Technology Gandhinagar, India

- MA-601, Mathematical Methods in Engineering (Graduate Course)   Spring 2022
- MA-601, Mathematical Methods in Engineering (Graduate Course)   Fall 2021
- MA-201, Complex Analysis and ODE (Undergraduate course)   Fall 2019
- MA-202, Probability Theory and Numerical Analysis (Undergraduate course)   Spring 2019
- MA-201, Complex Analysis and ODE (Undergraduate course)   Fall 2018
- MA-602, Advanced Numerical Methods in Engineering (Graduate course)   Spring 2018
- MA-602, Advanced Numerical Methods in Engineering (Graduate course)   Spring 2018

TALKS PRESENTED

1. **Identities associated with Dirichlet series satisfying Hecke's functional equation**
   - 35th Automorphic Forms Workshop, May 22-26, 2023, Louisiana State University, Baton Rouge, Louisiana, USA.

2. **FFW function and the smallest part function of Andrews ("On sum-of-tails identities")**
   - CombinaTexas 2023, Texas A&M University, College Station, TX, USA. April 22-23, 2023.
   - International conference on Number theory and Algebra IIT (BHU) : December 22, 2020

3. **Divisor function in number fields**
   - Bayou Arithmetic Research Day (BARD 2), April 18, 2023, Tulane University, New Orleans, LA, USA.

4. **Abel-Plana summation formula and its varianta**
   - Southern Regional Number Theory Conference (SRNTC 2023) March 11-12, 2023, Louisiana State University, Baton Rouge, LA, USA
   - Number theory seminar, University of Texas at Tyler (April 2023).

5. **Koshliakov zeta functions and modular relations**
   - Taipei postdoc seminar, Institute of Mathematics, Academia Sinica, Taipei, Taiwan, November 16, 2022.
   - [Invited] Nottingham Seminar at the University of Nottingham, UK. (Online), November 7, 2022
   - ENTR Workshop, TU Darmstadt, Germany, October 26-28, 2022
   - Southern Regional Number Theory Conference, LSU Baton Rouge, LA: March 13, 2022
   - Seminar talk at IIT Kanpur : November 5, 2021.

ARTICLE REVIEWS

- The Ramanujan Journal, Springer

- Journal of Applied Analysis, De Gruyter