TARUN DALAL

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PERSONAL

Nationality *Indian*
Date of Birth *21/08/1994*

POSITIONS HELD

ShanghaiTech University *August 2023-Present*
Postdoctoral Fellow

Harish-Chandra Research Institute *January 2023 - August 2023*
Postdoctoral Fellow

EDUCATION

Indian Institute of Technology Hyderabad *July 2017 - November 2022*
Doctor of Philosophy in Mathematics
Thesis title: On the structure of Drinfeld modular forms of level $\Gamma_0(T)$, Atkin-Lehner theory, and Congruences.
Advisor :- Dr. Narasimha Kumar.

Indian Institute of Technology Hyderabad *July 2015 - May 2017*
Master of Science in Mathematics. CGPA – 9.32 out of 10

University of Kalyani *August 2011 - May 2014*
Bachelor of Science in Mathematics Honours. Percentage - 74.875

Nabadwip Siksha Mandir High School *2011*
Class 12th. Percentage - 82.60

Nabadwip Siksha Mandir High School *2009*
Class 10th. Percentage - 77.125

AREA OF INTERESTS

Modular forms over rationals, Modular curves, Computational Number theory, Drinfeld modular forms.

MASTER THESIS

Representation Theory of Finite Groups
Supervisors :- Dr. Pradipto Banerjee & Dr. Narasimha Kumar

PUBLICATIONS

1. **Infinitely many cubic points for $X_0(N)/\langle w_d \rangle$ with N square-free (joint with Dr. Francesc Bars). Ramanujan Journal 67 (2025), no. 3, 72.** (`https://link.springer.com/article/10.1007/s11139-025-01083-w`).
2. **On Automorphism Group of Quotient Modular Curves (joint with Dr. Francesc Bars). Journal of Algebra 672 (2025), 334-378.** `https://doi.org/10.1016/j.jalgebra.2025.02.037`

3. **A Basis for the space of weakly holomorphic Drinfeld modular forms of level T, Journal of Number Theory 258(2024), no. 5, 122-145.** https://doi.org/10.1016/j.jnt.2023.11.003

4. **Intermediate modular curves with infinitely many cubic points over $\mathbb{Q}$, International Journal of Number Theory, 20 (2024), no. 3, 701–713.** https://doi.org/10.1142/S1793042124500350

5. **The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications (joint with Dr. Narasimha Kumar). Journal of Algebra 619 (2023), 778–798.** https://doi.org/10.1016/j.jalgebra.2022.11.027

6. **Infinitely many cubic points for $X_0^+(N)$ over $\mathbb{Q}$ (joint with Dr. Francesc Bars). Acta Arith. 206 (2022), no. 4, 373–388.** https://doi.org/10.4064/aa220714-10-11

7. **On Mod p congruences for Drinfeld Modular forms of level pm (joint with Dr. Narasimha Kumar), Journal of Number Theory 228 (2021), no. 11, 253-275.** https://doi.org/10.1016/j.jnt.2021.04.020

8. **On Congruences and Linear relations for Drinfeld modular forms of level $\Gamma_0(T)$, arbitrary type (joint with Dr. Narasimha Kumar). Proc. Japan Acad. Ser. A Math. Sci. 99 (2023), no. 1, 13–18.** https://doi.org/10.3792/pjaa.99.003

9. **Notes on Atkin-Lehner theory for Drinfeld modular forms (joint with Dr. Narasimha Kumar), Bull. Aust. Math. Soc. 108 (2023), no. 1, 50–68.** https://doi.org/10.1017/S000497272200123X

PREPRINTS

1. **The modular automorphisms of quotient modular curves (joint with Dr. Francesc Bars).** https://arxiv.org/abs/2505.08401

2. **On the vanishing of coefficients of η^{26} (joint with Dr. Srilakshmi Krishnamoorthy). Submitted for publication.**

CONFERENCE PUBLICATIONS

- **On non-vanishing and sign changes of the Fourier coefficients of Hilbert cusp forms (joint with Narasimha Kumar). Topics in Number Theory, Ramanujan Math. Soc. Lect. Notes Ser., (2020), no. 26, 175–188.**
- **On non-vanishing of Fourier coefficients of primitive forms (joint with Narasimha Kumar). The Special Issue of The Proceedings of Telangana Academy of Sciences, Vol. 01, No. 01, 2020, 52-64.**

AWARDS AND SCHOLARSHIPS

- "Research Excellence Award" for outstanding research performance in Ph.D in Mathematics, IIT Hyderabad. *April 2022*
- "First prize in Paper Presentation", Research Scholar Day, IIT Hyderabad. *April 2021*
- "Dr. K.V.Rao Research Award 2020" 1st position. *September 2020*
- "INSPIRE Fellowship" for pursuing PhD in India (Did not avail). *December 2018*
- "Institute Silver medal" for securing highest CGPA in Mathematics in M.Sc. *August 2017*
- CSIR-UGC NET (LS) conducted by CSIR-UGC for the eligibility of Lectureship, *December 2016* All India Rank- 27.

- CSIR-UGC NET (JRF) conducted by CSIR-UGC for pursuing PhD in India, All India Rank- 52. *June 2016*
- "Excellence in Academic Award", IIT Hyderabad. *April 2016*
- "Institute Silver medal" in school for securing highest marks in 12th board exam. *2011*
- Received Merit cum means scholarship. *2010-2014*

TALKS

- "Modular curves with infinitely many cubic points", July 2024, Dcimas Jornadas Teoría de Números, Madrid, Spain.
- "On Drinfeld's Oldforms and Newforms", December 2022, IISER Thiruvananthapuram, Thiruvananthapuram, India.
- "On Drinfeld's Oldforms and Newforms", June 2022, Novenas Jornadas de Teoría de Números, Department of Mathematics and Computation, University of La Rioja, Logroño, Spain.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", April 2022, IIT Guwahati, Online.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", March 2022, The Institute of Mathematical Science, Online.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", February 2022, University of Arizona, Online.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", January 2022, University of Rochester, Online.
- "Drinfeld modular forms and applications", December 2021, IIT Hyderabad, Hyderabad, India.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", August 2021, Young Researchers in Algebraic Number Theory 2021, Online.
- "The structure of Drinfeld modular forms of level $\Gamma_0(T)$ and applications", June 2021, London Mathematical Society Summer Graduate Student Meeting, Online.
- "On mod p congruences for Drinfeld modular forms of level pm", October 2020, Number Theory Down Under 8, University of Melbourne, Online.
- "Some topics on Hilbert cusp forms, Modular Curves and Galois representations", August 2019, IIT Hyderabad, Hyderabad, India.
- "Hilbert cusp forms and Galois representations", August 2018, IIT Hyderabad, Hyderabad, India.
- "On the theory of Induced representations and a theorem of Frobenius", May 2017, IIT Hyderabad, Hyderabad, India.
- "On an application of Representation theory", December 2016, IIT Hyderabad, Hyderabad, India.

CONFERENCES AND WORKSHOPS

- "Dcimas Jornadas Teoría de Números", UAM and ICMAT, Madrid, Spain, 8th July - 12th July, 2024.
- NCM Workshop on Elliptic Curves, IISER Thiruvananthapuram, 03 - 15 April 2023.
- "Novenas Jornadas de Teoría de Números", Department of Mathematics and Computation, University of La Rioja, Logroño, Spain, 28th June -1st July, 2022.

- Workshop on "Elliptic curves and the special values of L-functions", ICTS Bengaluru, 2-7 August, 2021, Online.
- Workshop on "Recent developments around p-adic modular forms", ICTS Bengaluru, 30 November - 4 December, 2020, Online.
- Workshop on "Perfectoid Spaces", ICTS Bengaluru, Bengaluru, India, 9-20 September, 2019.
- "CMI-HIMR Summer School in Computational Number Theory", Heilbronn Institute for Mathematical Research, University of Bristol, Bristol, UK, 17-28 June, 2019.
- "Intercity Number Theory seminar", IISER Tirupati, Tirupati, India, 17-18 December, 2018.
- Workshop on "L-Functions", I.I.T Bombay, Bombay, India, 25-30 June, 2018.
- Workshop on "Algebraic Number Theory", I.I.T Guwahati, Guwahati, India, 14th May - 2nd June, 2018.
- "School on Modular forms", Kerala School of Mathematics, Kerala, India, 12-24 February, 2018.
- Conference on "Number theory: Arithmetic, Diophantine and Transcendence", I.I.T Ropar, Ropar, India, 22-25 December 2017.
- GIAN course on "Transcendental Numbers and Special Values of Dirichlet Series", I.I.T Ropar, Ropar, India, 16-21 December 2017.
- Workshop on "Theoretical and Computational Aspects of the Birch and Swinnerton-Dyer Conjecture", ICTS Bengaluru, Bengaluru, India, 12-22 December 2016.
- Conference on "Modular Forms", IISER Bhopal, Bhopal, India, 4th September, 2016.

RESEARCH VISITS

- Visited Prof. Francesc Bars, Universitat Autònoma de Barcelona, 2nd July- 31st July, 2024.
- Visited Dr. Srilakshmi Krishnamoorthy, Indian Institute of Science Education and Research Thiruvananthapuram, 22nd September 2022- 12th December 2022.
- Visited Prof. Francesc Bars, Universitat Autònoma de Barcelona, 4-9 July, 2022.

COMPUTER SKILLS

SAGE, PARI/GP ,MAGMA

TEACHING EXPERIENCE

- During my postdoc tenure at ShanghaiTech University, I was teaching assistant for the following courses:
  - Algebra 2 (September 2024-January 2025).
  - Linear Algebra II (February 2024-June 2024).
  - Algebra 2 (September 2023-January 2024).
- During my postdoc tenure at HRI, I served as a tutor for the following programs:
  - NCM Workshop on Elliptic Curves, 03.04.2023-15.04.2023, Organized by IISER Thiruvananthapuram.
  - Summer Programme in Mathematics, 19.06.2023-08.07.2023, Organized by HRI, Allahabad.

- During my PhD at IIT Hyderabad, I was the teaching assistant for the following courses:

  Topology (January 2021 - May 2021), Linear Algebra (July 2019 - December 2019), Elements of Groups and Rings (January 2018 - May 2018), Linear Algebra (January 2021 - May 2021), Calculus-I, Calculus-II (July 2020-December 2020), Complex Analysis (January 2019 - May 2019), Calculus-I (July 2018 - December 2018), Linear Algebra (January 2018 - May 2018), Calculus-I (July 2017 - December 2017)

UNDERGRADUATE GUIDANCE

- Bowen Gan (Topic: Number Theory), ShanghaiTech University, September 2024-.