Himanshu Shukla

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Personal Information

- **Address:** Nobelstr. 19, 95444 Bayreuth, Germany

- **Mobile number:** +49 15124463475

- **Birth date/place:** 04.12.1995 (DD.MM.YYYY) / Prayagraj, Uttar Pradesh, India

Research Interests

I am interested in Arithmetic and Algebraic Geometry, rational points on curves, and Number Theory. I am also interested in real geometry and sparse polynomials.

Employment

Universität Bayreuth

- Assistant at Chair of Algebraic Geometry (Oct' 2024–present)

University of Bristol

- Research Associate (Mar' 2024–Aug' 2024)

Universität Bayreuth

- Doctoral Researcher (Jan' 2020–Jun' 2023)

Max Planck Institut für Infromatik

- Doctoral Researcher (Jul' 2019–Dec' 2019)

Education

Universität Bayreuth

- Ph.D., Degree (Sep' 2024).

- Advisor: Prof. Dr. Michael Stoll (funded by Deutsche Forschungsgemeinschaft (DFG)).

Max Planck Institut für Informatik

- Doctoral Researcher (Jul' 2019–Dec' 2019).

- Advisor: Prof. Dr. Markus Bläser (funded by Max Planck Gesellschaft (MPG)).

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[1]Updated February 2, 2025

Indian Institute of Technology (IIT) Kanpur

- B.Tech.-M.S., Dual-Degree, (Aug' 2018).

- B.Tech. part: Computer Science and Engineering (GPA: 8.6/10).

- M.S. part: Mathematics (GPA: 9.7/10).

PUBLICATIONS AND PREPRINTS

10. **Examples of Kodaira dimension 1 and rigid action on torus quotients with simple higher dimensional factors** (joint with C. Gleissner). (in prep.).

9. **11-descent on elliptic curves and twisted special L-value** (joint with C. Maistret). (submitted). (arxiv.org/abs/2501.09515).

8. **Rank bounds on curves of the form $y^2 = x(x^2 - p^2)(x^2 - 4p^2)$** (joint with T. Evink). (in prep.).

7. **The Cassels-Tate pairing on 2-Selmer groups of odd-degree hyperelliptic curves**. (in prep.).

6. **Towards a classification of isolated j-invariants** (joint with A. Bourdon, S. Hashimoto, T. Keller, Z. Klagsburn, D. Lowry-Duda, T. Morrison and F. Najman). (to appear in *Mathematics of Computation*). (https://arxiv.org/abs/2311.07740).

5. **The Cassels-Tate pairing on 2-Selmer groups of elliptic curves** (joint with M. Stoll). (submitted). (arxiv.org/abs/2302.01640).

4. **How many zeros of a random sparse polynomial are real?** (joint with G. Jindal, A. Pandey and C. Zissopuolos). In Proceedings of the 45th International Symposium on Symbolic and Algebraic Computation (ISSAC), 2020, ACM (New York), 273–280. (arxiv.org/abs/1911.02540).

3. **On definable functions of Atomless Boolean Algebras** (joint with A. Kuber). (in prep.).

2. **Definable combinatorics with dense linear orders** (joint with A. Kuber and A. Jain). Archive for Mathematical Logic 59 (2020), no. 5-6, Springer Verlag, 679–701. (arxiv.org/abs/1807.06097).

1. **On Resource-bounded versions of the van Lambalgen's theorem** (joint with D. Chakraborty and S. Nandakumar). In Gopal, T., Jäger , G., Steila, S. (eds) Theory and Applications of Models of Computation. TAMC 2017. Lecture Notes in Computer Science(), 10185 Springer, Cham, 129–143. (arxiv.org/abs/1704.01101).

TALKS

15. *Evidence for a question of Dokchitser-Evans-Wiersema and 11-descent on elliptic curves.* Universität Würzburg, Oberseminar, 2024.

14. *Examples of Galois action on Ш of an elliptic curve.* Rheinland-Pfälzische Technische Universität Kaiserslautern, Oberseminar, 2024.

13. *Cassels-Tate pairing on Jacobians of Hyperelliptic curves.* University of Bristol, Linfoot Seminar, 2024.

12. *Cassels-Tate pairing on the curves of the form $y^2 = x(x^2 - p^2)(x^2 - 4p^2)$.* Universität Bielefeld, Early Number Theory Researchers (ENTR) Workshop, 2023.

11. *Cassels-Tate pairing on the curves of the form $y^2 = x(x^2 - p^2)(x^2 - 4p^2)$.* Universität Bayreuth, Oberseminar Arithmetische Geometrie, 2023.

10. *Computing Cassels-Tate pairing on superelliptic curves.* CISPA, St. Ingbert, Crypto Seminar, 2023.

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9. *Computing Cassels-Tate pairing on the curves of the form $y^2 = x^l + A$*. Rijksuniversiteit Groningen, Algebra Seminar, 2022.

8. *Computing Cassels-Tate pairing on odd-degree hyperelliptic curves*. Schney, Rational Points, 2022.

7. *Cassels-Tate pairing on odd-degree hyperelliptic curves*. Universität Bayreuth, Oberseminar Arithmetische Geometrie, 2021.

6. *Playing dodgeball with Normality*. Universität Bayreuth, Oberseminar Arithmetische Geometrie, 2021.

5. *Computing Cassels-Tate pairing on 2-Selmer groups of elliptic curves*. Universität Bayreuth, Oberseminar Arithmetische Geometrie, 2020.

4. *Introduction to Heegner points I and II*. Universität Bayreuth, Oberseminar Arithmetische Geometrie, 2020.

3. *On expected number of zeros of random sparse polynomial*. Saarbrücken, Graduate School Seminar, MPI-Inf., 2019.

2. *On Grothendieck rings of some partial orders*. IIT Kanpur, Math-Stat Seminar, 2018.

1. *On resource bounded versions of van Lambalgen's theorem*. Universität Bern, 14th Annual conference on Theory and Models of Computation, 2017.

TEACHING EXPERIENCE

- Teaching Assistant, *Einführung in die Zahlentheorie und Algebraische Strukturen* (Winter Semester 2024-25), Universität Bayreuth.

- Teaching Assistant, *Einführung in die Theorie die Modulformen und Modulkurven* (Winter Semester 2021-22), Universität Bayreuth.

- Teaching Assistant, *Introduction to Complexity theory* (Winter Semester 2019-20), Universität Saarland.

- Teaching Assistant, *Abstract algebra* (Winter Semester 2017-18), IIT Kanpur.

ORGANIZATION

- Co-organizer of *Oberseminar Arithmetische Geometrie*, Seminar website (2022-2023).

WORKSHOPS AND SUMMER SCHOOLS

- *Pari-GP Atelier*. Paris, France, Université Paris-Saclay, 2025.

- *Instructional Workshop on Rational Points*. Groningen, Netherlands, Rijksuniversiteit Groningen, 2024.

- *Arizona Winter School on Abelian Varieties*. Tucson, US, Southwest Center for Mathematics, 2024.

- *Summer school on arithmetic statistics*. Luminy, France, CIRM, 2023.

- *COmputations and their Uses in Number Theory (COUNT)*. Luminy, France, CIRM, 2023.

- *Summer school on automorphic forms*. Budapest, Alfred Rényi Institute of Mathematics, 2022.

- *Summer school on elliptic curves*. Wales, Baskerville Hall, Hay on Wye, 2022.

- *Summer school on number theory as informed by computation*. Park City, Utah, PCMI, 2022.

- *Branching in number theory–p-adics in sciences (online)*. Leipzig, MPI-MiS, 2021.

- *Elliptic curves and L-functions (online)*. Bangalore, ICTS, 2021.

- *Theoretical and computational aspects of elliptic curves*. Bangalore, ICTS, 2017.

Awards and recognition

- Bhagwandas Sanghi Gold Medal for being the best dual-degree student in the Department of Mathematics and Statistics, IIT Kanpur (2018).

- Yogendra Nath and Sushma Gupta Scholarship for academic performance in Computer Science and Engineering department (2016).

- Academic Excellence Award by IIT Kanpur for achieving 10.0/10.0 GPA in first two semesters at IIT Kanpur (2014).

- All India Rank of 659 (99.95 percentile) in IIT-JEE (Advanced) (2013).

- Among top 1% nationwide in NSEC (National Standard Examination in Chemistry) and NSEA (National Standard Examination in Astronomy) and top 1% statewide in NSEP (National Standard Examination in Physics) (2012).

References

- Prof. Dr. Michael Stoll (Universität Bayreuth): michael.stoll@uni-bayreuth.de

- Dr. Celine Maistret (University of Bristol): celine.maistret@bristol.ac.uk

- Prof. Dr. Ingrid Bauer (Universität Bayreuth): ingrid.bauer@uni-bayreuth.de

Languages

English (fluent), Hindi (native), German (B2).