Himanshu Shukla

Contact Information

Master of Science.
Lehrstuhl für Computeralgebra,
Mathematisches Institut,
Universität Bayreuth, Germany.

Homepage: `http://mathe2.uni-bayreuth.de/hishukla`
Email: `Himanshu.Shukla@uni-bayreuth.de`

Research Interests

Arithmetic Geometry (theory and computational aspects), Modular Forms, Arithmetic of Elliptic Curves. I am also interested in problems related to polynomial arithmetic, sparse polynomials and normal numbers.

Employement

Chair of Computer Algebra, University of Bayreuth *(Jan '20–Present)*

Doctoral Researcher at the Chair of Computer Algebra. Deutsche Forschungsgemeinschaft (DFG) project on computation of Cassels-Tate Pairing.

Max Planck Institute for Computer Science *(Jul '19–Dec '19)*

Doctoral Researcher at International Max Planck Research School for Computer Science (Algorithms and Complexity group).

Visits

Tata Institute of Fundamental Research (TIFR), Mumbai, India *(Jun '17)*

Visiting Student Research Program (VSRP-2017) candidate for reading in modular forms under Prof. N. Fakhruddin.

Indian Institute of Science Education & Research (IISER) Pune, India *(Dec '15)*

Visiting student for reading in Algebraic Number Theory under Dr. Debargha Banerjee.

Education

Chair of Computer Algebra, University of Bayreuth *(Jan '20–Present)*

PhD student. Thesis supervisor: Prof. Dr. Michael Stoll

Max Planck Institute for Computer Science *(Jul '19–Dec '19)*

PhD student. Thesis supervisor: Prof. Dr. Markus Bläser

Indian Institute of Technology (IIT) Kanpur, India *(Jul '13 – Jul '18)*

Bachelor of Technology (B.Tech.) in Computer Science and Engineering and Master of Sciences (M.S.) in Mathematics (Dual Degree) with CPI/GPA=8.8 (PG - 9.7 & UG - 8.6) on a scale of 10.0.

Publications/ Preprints

- On Resource-Bounded versions of the van Lambalgen's theorem (joint work with Diptarka Chakraborty and Satyadev Nandakumar), 14^{th} *International Conference on Theory and Applications of Models of Computation (TAMC-2017)*,([https://doi.org/10.1007/978-3-319-55911-7_10]).
- Definable Combinatorics with Dense Linear Orders (joint work with A. Jain and A. S. Kuber) *Archive for Mathematical Logic*, ([https://doi.org/10.1007/s00153-020-00709-8]).
- On Definable Functions of Atomless Boolean Algebras (joint work with A. S. Kuber) *(in preparation).*
- How many zeros of random *sparse* polynomials are real? (joint work with G. Jindal, A. Pandey and C. Zisopoulos), 45^{th} *International Symposium on Symbolic and Algebraic Computation (ISSAC-2020)* ([https://doi.org/10.1145/3373207.3404031]).
- Cassels-Tate Pairing on 2-selmer groups of elliptic curves. (joint work with Michael Stoll) *(in prepartaion).*
- Computing Cassels-Tate pairing on odd-degree hyperelliptic curves. *(in preparation).*

Awards & Recognitions

- Awarded **Bhagwandas Sanghi Gold Medal** for being the best dual degree student in the Department of Mathematics and Statistics, IIT Kanpur. *(Jun '18)*
- Awarded **Yogendra Nath and Sushma Gupta Scholarship** for academic performance in Computer Science and Engineering department. *(Feb '16)*

- Awarded **Summer Undergraduate Research Grant of Excellence (SURGE)** for summer project under Prof. Satyadev Nandakumar. *(May '15 – Jul '15)*
- Awarded **Academic Excellence Award** by IIT Kanpur for achieving **10.0/10.0** GPA in first two semesters at IIT Kanpur. *(Dec '14)*
- Received **Dr. D. R. Bhagat Scholarship** for academic excellence at IIT Kanpur in the Computer Science and Engineering department. *(Feb '14)*
- Secured an All India Rank of **659 (99.6 percentile)** in IIT-JEE (Advanced) 2013. *(Jun '13)*
- 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. *(Nov '12)*

Teaching & Scribes

- Tutor for the course **Einführung in die Theorie die Modulformen und Modulkurven** (Introduction to the theory of modular forms and modular curves).
- Teaching Assistant for the course **Abstract Algebra (CS203B)**.

Workshops

- Workshop on *Theoretical and Computational aspects of Birch and Swinnerton Dyer Conjecture* held at ICTS Banglore, India.
- Workshop on *Perspectives in Complexity Theory and Cryptography* held at IISc Banglore, India.

Talks

- On Resource-Bounded versions of the van Lambalgen's theorem, *14th TAMC, University of Bern*, Switzerland, 2017.
- Model theoretic Grothendieck rings of some structures with quantifier elimination, *Math–Stat Seminar, Department of Mathematics and Statistics, IIT Kanpur*, 2018.
- On expected number of zeros of a random sparse polynomial, *Graduate Research Seminar*, Max Planck Institute for Computer Science, Saarbrücken, 2019.
- Cassels-Tate pairing on elliptic curves, *Oberseminar Arithmetische Geometrie*, Universität Bayreuth, 2020.
- Playing dodgeball with normality, *Oberseminar Arithmetische Geometrie*, Universität Bayreuth, 2021.
- Cassels-Tate pairing on hyperelliptic curves, *Oberseminar Arithmetische Geometrie*, Universität Bayreuth, 2021.
- Computing Cassels-Tate pairing on odd-degree hyperelliptic curves, *Oberseminar Arithmetische Geometrie*, Universität Bayreuth, 2022.
- Computing Cassels-Tate pairing on the 2-Selmer group of odd-degree hyperelliptic curves. *Rational Points*, Schloss Schney, 2022.

Technical Skills

Programming Languages & Software - C/C++, Python, MATLAB, Octave, Sage, Magma, LaTeX.