

CONTACT INFORMATION

Nationality: Indian

Languages: English (fluent), German (basic), Hindi, Bengali (native)

EMPLOYMENT

- **University of Sheffield**
Research associate at the University of Sheffield
December 2020 - present.
- **Basque Center for Applied Mathematics, Bilbao, Spain**
Postdoctoral fellow sponsored by Javier F. de Bobadilla
September 2016 - December 2019.
- **Tata Institute of Fundamental research (TIFR), Mumbai, India**
Postdoctoral fellow, January 2016 - August 2016.

EDUCATION

- **Humboldt University of Berlin, Germany**
PhD student in mathematics, August 2010 - October 2015
Thesis title: *Geometry of the Noether-Lefschetz locus*
- **Humboldt University of Berlin, Germany**
M.Sc. in Mathematics, October 2007 - September 2009
Master thesis title: *Classification of the components of the Noether-Lefschetz locus of large dimension*
- **Chennai Mathematical Institute, Chennai, India**
B.Sc.(Hons) in Mathematics and Computer Science, August 2004 - May 2007

RESEARCH INTERESTS

Algebraic geometry, variation of mixed Hodge structures, Noether-Lefschetz locus, Moduli space of semi-stable sheaves and Higgs bundles, McKay correspondence, Non-abelian Hodge theory.

PUBLICATIONS

Top 5 publications in the last 5 years

1. *Generalization of a conjecture of Mumford* with Inder Kaur, *Advances in Mathematics*, Vol. 383, pp. 107676 (2021).
2. *On a conjecture of Harris*, *Communications in Contemporary Mathematics*, Vol. 23.07, pp. 2050028, (2020).
3. *Néron models of intermediate Jacobians associated to moduli spaces* with Inder Kaur, *Revista Matemática Complutense*, Vol. 33.3, pp. 885 – 910, (2019).
4. *Hodge conjecture for the moduli space of semi-stable sheaves over a nodal curve* with Inder Kaur, published in *Annali di Matematica Pura ed Applicata*, DOI- 10.1007/s10231-022-01225-7 (2022).
5. *Degeneration of Intermediate Jacobians and the Torelli theorem* with Suratno Basu and Inder Kaur, *Documenta Mathematica*, vol. 24, p. 1739 – 1767 (2019).

¹Updated May 26, 2023

Remaining publications by date

6. *Examples of non-flat bundles of rank one*, with Agustín Romano-Velázquez, to appear in *Comptes Rendus-Série Mathématique*, (2022)
7. *Determinant morphism for singular varieties*, with Inder Kaur, to appear in *Annali della Scuola Normale Superiore di Pisa, Classe di scienze*, (2022)
8. *Generators of the cohomology ring, after Newstead*, with Suratno Basu and Inder Kaur, *Proceedings of the American Mathematical Society*, Vol. 150, No. 6, pp. 2569–2577 (2022)
9. *Local topological Obstruction for divisors*, with Indranil Biswas, *Revista Matemática Complutense*, Vol. 34.3, pp. 615 – 640, (2021)
10. *Descent theory of simple sheaves on C_1 -fields*, with Inder Kaur, *Revista Matemática Contemporânea*, Vol. 47, pp. 82 – 98, (2020)
11. *Examples of varieties with index one on C_1 -fields*, with Inder Kaur, *Journal of Number Theory*, Vol. 203, p. 242 – 248, (2019)
12. *Criterion for logarithmic connections with prescribed residue*, with Indranil Biswas and Arjun Paul, *Manuscripta Mathematica*, Vol. 155, Issue 1 – 2, p. 77 – 88, (2018)
13. *On generically non-reduced components of Hilbert schemes of smooth curves*, *Mathematische Nachrichten*, Vol. 290, Issue 17 – 18, p. 2800 – 2814, (2017)
14. *Logarithmic connections on principal bundles over a Riemann surface*, with Indranil Biswas, Arjun Paul and Arideep Saha, *International Journal of Mathematics*, Vol. 28, Issue 12, (2017)
15. *Notes on solvability of curves on surfaces*, with M. Z. Fashami and N. Zangani, *Le Matematiche*, Vol. LXXII – Fasc. II, pp. 115 – 129, (2017)
16. *Noether-Lefschetz locus and a special case of the variational Hodge conjecture: using elementary techniques*, *Analytic and Algebraic Geometry*. Springer, p. 107 – 115, (2017)
17. *Semi-regular varieties and variational Hodge conjecture*, with Inder Kaur, *Comptes rendus Mathématique* 354(3), (2016)
18. *On a conjecture by Griffiths and Harris concerning certain Noether–Lefschetz loci*, *Communications in Contemporary Mathematics*, Vol. 17, no. 05, p. 1550002, (2015)

PREPRINTS

1. *Mumford Tate groups and the Hodge conjecture*, with Inder Kaur, arXiv:2301.01005 [math.AG], (2023).
2. *Failure of Lefschetz hyperplane theorem*, arXiv:2301.04940 [math.AG], (2023).
3. *Matrix factorization for quasi-homogeneous singularities*, with Agustín Roman-Velázquez, arXiv:2301.05052 [math.AG], (2023)

RESEARCH GRANTS

- Successful LMS Research Workshop Grants application (ref. WS-2223-01), 2023.
- Successful FAPESP Grant application 2020/07369-3 for 5 years starting 2021. Rejected grant in favour of Sheffield position. I was the principal investigator for this grant.
- Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) grant, PDJ 155320/2018 – 1, March 2019 - July 2019. I was the principal investigator for this grant.

PROJECT PARTICIPATION

- Research associate at the University of Sheffield, funded by EPSRC Grant EP/T019379/1 (PI.- Dr. Evgeny Shinder), December 2020 - October 2023
- Postdoctoral fellow funded by ERCEA Consolidator Grant 615655-NMST (PI.- Prof. Javier F. de Bobadilla), September 2016 - December 2019
- Postdoctoral fellow funded by a scholarship from Tata Institute of Fundamental Research, India, January 2016 - August 2016
- “Wissenschaftlicher Mitarbeiter” under DFG Grant KL-2244/2 – 1 (PI.- Prof. Remke Kloosterman), August 2010 - July 2013
- Scholarship from Berlin Mathematical school, Berlin, October 2007 - July 2010

TEACHING EXPERIENCE

Undergraduate teaching

- “Topics in Number Theory” (level 3 module, 10 credits), University of Sheffield, Autumn Semester 2022-23
- “Topics in Number Theory” (level 3 module, 10 credits), University of Sheffield, Autumn Semester 2021-22

Advanced teaching

- “Noether-Lefschetz locus with applications to deformation theory” at Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil February 2018.
- “Nori connectivity theorem and applications” at Tata Institute of Fundamental research, Mumbai, India, Spring term 2016
- “Introduction to scheme theory and Hilbert polynomials” at ATM school on “The Grothendieck Riemann Roch theorem”, University of Hyderabad, India, 7th to 18th December, 2015

SEMINARS ORGANIZED

- Derived Categories, Hodge theory and Singularity theory, co-organized with Evgeny Shinder, University of Sheffield, June 28 – 30, 2023
- Perverse sheaves learning seminar, co-organized with Evgeny Shinder, University of Sheffield, June / July 2021

RESEARCH ACTIVITIES

Selected Talks and Poster Presentation

- *On the Drozd-Greuel-Kashuba conjecture*, Alfred Renyi Institute of Mathematics, Budapest, Hungary 2023.
- *On the Drozd-Greuel-Kashuba conjecture*, University of Glasgow, UK, 2022
- *McKay correspondence on isolated Gorenstein singularities*, University of Nottingham, UK, 2022
- *McKay correspondence on isolated \mathbb{Q} -Gorenstein singularities*, University of Sheffield, UK, 2021

- *Geometric and topological obstructions*, IMPA, Rio de Janeiro, Brazil, 2021
- *Applications of variations of Hodge structures*, Leibniz Universität Hannover, Germany, January 2020
- *Aspects of the semi-regularity map*, Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil, March 2019
- *Degeneration of Torelli theorem*, satellite conference of ICM, Instituto de Ciências Matemáticas e de Computação Universidade de São Paulo, Brazil, July 2018
- *Noether-Lefschetz locus with applications to deformation theory*, Instituto de Matemática Pura e Aplicada (IMPA), Brazil, February 2018
- *4º Congresso de Jovens investigadores*, Universitat de València, Spain, September 2017
- *Smoothing of normal surface Singularities*, BCAM-Basque Center for applied mathematics, Spain, December 2016
- *Overview of variation of Hodge structures and applications*, BCAM-Basque Center for applied mathematics, Spain, October 2016
- *Geometry of Noether-Lefschetz locus*, Tata Institute of Fundamental research, India, December 2015
- Poster-presentation at *Algebraic Varieties and their moduli*, Centro di Ricerca Matematica, Ennio De Giorgi, Pisa, Italy, May 2015
- *Autumn school on Rationally connected varieties*, University of Poitiers, France, September 2013
- *What is a Hodge locus*, “What is” seminar, Berlin Mathematical School, December 2012
- Poster-presentation at *Géométrie Algébrique en Liberté XX*, Institut Fourier, Université de Grenoble, France, June 2012
- *Non-reduced components of the Noether-Lefschetz locus*, Workshop on algebraic surfaces, Leibniz Universität Hannover, Germany, February 2012
- *Noether-Lefschetz locus of projective hypersurfaces*, Arithmetic Geometry seminar, Humboldt University, Germany, June 2011
- *Classifying the biggest components of the Noether-Lefschetz locus*, Arithmetic Geometry seminar, Humboldt University, Germany, January 2010

Research Stays

- Tata Institute of fundamental research, Mumbai, India, February 2020 - September 2020, November 2017 - January 2018
- Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil, January 2020 - February 2020, March 2019 - June 2019 and February 2018
- Instituto de Ciências Matemáticas e de Computação Universidade de São Paulo, Brazil, July 2018
- University of Hyderabad, Hyderabad, India, December 2015

SERVICES

- Refereed articles for *Manuscripta Mathematica*, *Annali di Matematica pura ed applicata* and *Pure and Applied Mathematics Quarterly*. I am also a reviewer at *Zentralblatt*
- Served on the PhD committee of Roberto Tomas Villaflor Loyola on “Periods of algebraic cycles” at Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil