Jyoti Dasgupta

Contact details

Assistant Professor, Office- 318-B, Department of Mathematics & Computing, IIT(ISM) Dhanbad, Dhanbad-826004.
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Research Interest

Algebraic Geometry, Algebraic Topology

Research Experience

Visiting Fellow October 2022- August 2023
School of Mathematics, TIFR Mumbai, Homi Bhabha Road, Navy Nagar, Colaba, Mumbai-400005

Post Doctoral Fellow July 2019- October 2022
Department of Mathematics, IISER Pune, Dr. Homi Bhabha Road, Pashan, Pune-411008
Mentor: Prof. Mainak Poddar.

Institute Pre-doctoral Fellow Jan 2019- July 2019
Department of Mathematics, IIT Madras, Chennai, 600036.

Education Timeline

Ph. D. in Mathematics 2014-19
Department of Mathematics, IIT Madras, Chennai, 600036.
Thesis title: Cohomology of torus manifold bundles.
Thesis submitted: January 11, 2019.
Thesis defended: March 25, 2019.
PhD awarded: July 19, 2019.
Supervisors: Dr. V. Uma and Dr. Arijit Dey.

M.Sc. in Mathematics 2012-14
Passed with CPI 9.6 from IIT Bombay.

B.Sc. in Mathematics 2009-12
Passed with 84.75% from University of Calcutta.

Publications

- Cohomology of torus manifold bundles (with Bivas Khan and V. Uma), Math. Slovaca, Vol 69, 2019, No. 3, 685-698, doi: doi.org/10.1515/ms-2017-0257, arXiv.
- Equivariant K-theory of quasitoric manifolds (with Bivas Khan and V. Uma), Proc. Indian Acad. Sci. Math. Sci.,Vol 129(2019), No 5, Art. 72, 13 pp, doi: doi.org/10.1007/s12044-019-0501-0, arXiv.
- Toric vector bundles on Bott tower (with Bivas Khan), Bull. Sci. Math., 155(2019), 74-91, doi: doi.org/10.1016/j.bulsci.2019.04.003, arXiv.
- Stability of equivariant vector bundles over toric varieties (with Arijit Dey and Bivas Khan), Doc. Math., Volume 25, 1787-1833 (2020), doi: 10.25537/dm.2020v25.1787-1833, arXiv.
- Erratum to: “Stability of equivariant vector bundles over toric varieties” (with Arijit Dey and Bivas Khan), Doc. Math., Volume 26, 1271-1274 (2021), DOI: 10.25537/dm.2021v26.1271-1274.
- Seshadri constants of equivariant vector bundles on toric varieties (with Bivas Khan and Aditya Subramaniam), J. Algebra, Volume 595, 38-68 (2022), doi.org/10.1016/j.jalgebra.2021.11.040, arXiv.
- Seshadri constants on Bott towers (with Indranil Biswas, Krishna Hanumanthu and Bivas Khan), J. Algebra, Volume 601, 178-197 (2022), doi.org/10.1016/j.jalgebra.2022.03.003, arXiv:2006.12723 [math.AG].
- Classification, reduction and stability of toric principal bundles (with Bivas Khan, Indranil Biswas, Arijit Dey and Mainak Poddar), Transform. Groups (2023). doi.org/10.1007/s00031-023-09812-5, arXiv:2012.13540 [math.AG].
- Equivariant Vector Bundles on complexity-one T-varieties and Bruhat-Tits buildings (with Chandranandan Gangopadhyay, Kiumars Kaveh and Christopher Manon), IMRN(2025). doi,org/10.1093/imrn/rnaf124, arXiv:2406.02912 [math.AG].

Preprints

- Logarithmic connections on principal bundles over normal varieties (with Bivas Khan and Mainak Poddar), preprint available at arXiv:2211.03047 [math.AG].

Talks given

- *Affine monoids and their Hilbert bases* at the Algebra Seminar, IIT Madras, March 2016.
- *Cohomology ring of smooth complete toric variety* at the Algebra Seminar, IIT Madras, October 2017.
- *On the cohomology ring of torus manifolds and related spaces* at the Mathematics Department In-house Symposium, IIT Madras, October 6, 2018.
- *Toric vector bundles on Bott tower* at the IISER Pune Math In-house Symposium, August 31, 2019.
- *Equivariant principal bundles on nonsingular toric varieties* at the IISER Pune Postdoc Symposium, March 13, 2020.
- *Stability of equivariant vector bundles over toric varieties* at the Virtual Math Fest, July 20, 2020. Video of the talk is available here.
- *Classification, reduction and stability of toric principal bundles* at the IISER Pune Math Postdoc Symposium (online), March 23, 2021.
- *Classification, reduction and stability of toric principal bundles* at the IISc-IISER Pune Twenty-20 Symposium (online), September 18, 2021. Video of the talk is available here.
- *Logarithmic connections on toric principal bundles II* at the IISER Pune Math In-house Symposium (hybrid mode), March 17, 2022. Video of the talk is available here, from 7:24:16.
- *Seshadri constants of equivariant vector bundles on toric varieties* at the Toric Topology 2022 in Osaka Conference (online), March 25, 2022. Slides of the talk are available here.
- *Seshadri constants of equivariant vector bundles on toric varieties* at the Conference on Topics in Algebraic Geometry and Commutative Algebra at SRM University AP, July 20, 2022. Slides of the talk are available here.
- *Logarithmic connections on toric principal bundles* at the LMS-Bath Workshop on Combinatorial Algebraic Geometry at University of Bath, UK, August 03, 2022.
- *Seshadri constants of equivariant vector bundles on toric varieties* at the Summer School on Combinatorial Methods in Algebraic Geometry at University of Cambridge, September 06, 2022.
- *Seshadri constants of equivariant vector bundles on toric varieties* at the Indian Women in Mathematics Annual Conference at IISER Pune, December 27, 2022.
- *Equivariant vector bundles over toric varieties* at the Mathematics Colloquium at TIFR Mumbai, January 19, 2023.
- *Finite generation of certain valuation semigroups on toric surfaces* at the Algebraic Geometry Preprint Seminar at TIFR Mumbai, February 22, 2023.
- *Logarithmic connections on toric principal bundles* at the Algebraic Geometry Symposium in RMS 38th annual conference at IIT Guwahati, December 24, 2023.
- *Logarithmic connections on toric principal bundles* at the International Conference on Women in Pure and Applied Mathematics at at SRM University AP, January 1, 2024
- *Equivariant Vector Bundles on complexity-one T-varieties and Bruhat-Tits buildings* at the Algebraic Geometry Symposium in RMS 39th annual conference at Christ (Deemed to be) University Bangalore, December 28, 2024.
- *Equivariant Vector Bundles on complexity-one T-varieties and Bruhat-Tits buildings* at the Discussion Meeting in Algebraic Geometry in TIFR Mumbai, February 10, 2025.

Poster Presentation

- Presented a poster titled "Cohomology of Toric Varieties and Related Spaces" in Conference on Commutative Algebra and Algebraic Geometry held at IISER Bhopal in July 2019.
- Presented a poster titled "Seshadri constants of equivariant vector bundles on toric varieties" in VBAC 2022: Moduli spaces and vector bundles-New trends held at University of Warwick, UK in July 2022.

Workshops and Conferences Attended

- Advanced Instructional School in Algebraic Surfaces in MCNS, Manipal in July 2015.
- Workshop on The Grothendieck-Riemann-Roch Theorem in University of Hyderabad in Dec 2015.
- School on K-theory and its Applications in ISI Bangalore from December 2016 - January 2017.
- Workshop on Seshadri Constants in Chennai Mathematical Institute from January - February 2017.
- Conference on Algebraic Geometry and related areas held at IMSc Chennai in July 2018.
- Conference on Geometric Topology held at Bhaskaracharya Pratishthana Pune in December 2019.
- Discussion meeting on Moduli of Bundles and Related Structures held at ICTS Bangalore in February 10-14, 2020.
- LMS-Bath Workshop on Combinatorial algebraic geometry held online in July 26-August 6, 2021.

Academic Achievements

- Awarded Chebyshev grant to attend ICM 2022.
- Awarded NBHM (National Board for Higher Mathematics) Post doctoral Fellowship.
- Awarded CSIR (Council of Scientific and Industrial Research)-Junior Research Fellowship in Mathematics, June 2014 with All India Rank-22.
- Awarded NBHM (National Board for Higher Mathematics) M.Sc. Scholarship for 2012-14.
- Received the Institute Silver Medal from IIT Bombay for standing first in M.Sc. Mathematics for the batch 2012-14.
- Received the P. V. Sukhatme Memorial award for standing first in the first three semesters of M.Sc Mathematics.
- Secured All India Rank 17 in Joint Admission Test for M.Sc (JAM) 2012.
- Awarded Gold medal for securing first Rank in B.Sc. Mathematics in University of Calcutta for the batch 2009-12.

Teaching Experience

Instructor for the following courses in IIT(ISM) Dhanbad:

- Engineering Mathematics-II for Winter 2024-25.
- Advanced Algebra for Monsoon 2024-25.
- Mathematics-II for Summer 2023-24.
- Linear Algebra for Winter 2023-24.
- Mathematics-II for Winter 2023-24.
- Numerical Methods Practical for Monsoon 2023-24.

Served as a Teaching Assistant for the following courses:

- Function of Several Variables (IIT Madras)
- Series and Matrices (IIT Madras)
- Calculus-I (IISER Pune)
- Analysis-I (IISER Pune)
- Advanced Linear Algebra (IISER Pune)
- Linear Algebra for Engineers (IIT Madras)
- Differential Equations (IIT Madras)
- Basic Structures in Mathematics (IISER Pune)
- Real Analysis-I (IISER Pune)
- Calculus-II (IISER Pune)

References

Dr. V. Uma
Associate Professor,
Department of Mathematics,
IIT Madras,
Chennai-600036, India.

Dr. Arijit Dey
Associate Professor,
Department of Mathematics,
IIT Madras,
Chennai-600036, India.

Prof. Mainak Poddar,
Professor,
Department of Mathematics,
IISER Pune,
Pune-411008, India.

Prof. Krishna Hanumanthu
Professor,
Department of Mathematics,
CMI,
Kelambakkam-603103, India.

Prof. Indranil Biswas
Senior Professor,
School of Natural Sciences,
Shiv Nadar University,
NH91, Tehsil Dadri, Greater Noida,
Uttar Pradesh 201314, India.