

# Oishee Banerjee

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School of Mathematics,  
Institute for Advanced Studies.

## Research Interests

Primarily a topologist, I use techniques from homotopy theory, sheaf theory and algebraic geometry to understand the topology of moduli spaces of algebro-geometric origins, oftentimes having interesting arithmetic consequences.

## Publication and Preprints

- Cohomology of the space of polynomial maps on  $\mathbb{A}^1$  with prescribed ramifications, *Advances in Mathematics Volume 359*, 7 January 2020, 106881
- Filtration of cohomology via symmetric semisimplicial spaces, <https://arxiv.org/pdf/1909.00458.pdf>, *submitted*
- On the cohomology of certain subspaces of  $Sym^m(\mathbb{P}^1)$  Occam's razor for Hodge structures, *Research in the Mathematical Sciences volume 8*, Article number: 25, April 2021
- Étale cohomological stability of the moduli space of stable elliptic surfaces, with Jun-Yong Park and Johannes Schmitt, arXiv:2207.02496 (2022), *submitted*

## Work in progress

- Stability in cohomology via the symmetric simplicial category (*draft available on request*)
- Moduli space of nondegenerate maps on a smooth projective curve, with Claudio Gómez-González
- Unirationality of Hurwitz spaces of degree 4 branched covers of  $\mathbb{P}^1$  with prescribed ramification and monodromy group  $D_4$

## Employment

August 2019-August 2022 **Postdoc**, Hausdorff Centre for Mathematics, Bonn, Germany.

September 2022-July 2023 **Postdoctoral Member**, Institute for Advanced Studies, School of Mathematics, Princeton, NJ, USA.

## Education

2013-2019 **Ph.D candidate, Mathematics**, Advisor: Benson Farb, Co-advisor: Alexander Beilinson, University of Chicago, USA.

- 2015 **M.S.**, *Mathematics*, University of Chicago, USA.  
 2010-2013 **B.Math**, (*Bachelor in Mathematics*), with distinction, Indian Statistical Institute (ISI), Bangalore.

## Awards and Scholarships

- Summer 2012 **VSRP fellowship**, by *Tata Institute of Fundamental Research*, for undergraduate research under the supervision of Amalendu Krishna.  
 2010-2013 **INSPIRE fellowship**, *Department of Science and Technology*, Government of India.  
 2010-2013 **Scholarship awarded by the ISI**, (*declined in favor of INSPIRE fellowship*).

## Teaching Experience

- 2015-2018 Math 131/2/3: Elementary Functions and Calculus I/II/III (Instructor)  
 2014-2015 Worked as TA for Kevin Corlette, George Glauberman, and Ridgeway Scott  
 Winter 2018 Grader for Graduate Algebraic Geometry, Madhav Nori  
 Spring 2017 Grader for Graduate Complex Analysis, Greg Lawler  
 Summer '14, '16, '18 Mentor, Research Experience for Undergraduates, University of Chicago, on topics spanning Percolation Theory, Riemannian Geometry, Complex Analysis, Topology, Galois theory etc., supervised about 15 undergraduate projects

## Invited Talks

- April 2019 Columbia University, *Topology seminar*  
 April 2019 University of California, Irvine, *AG-Topology seminar*  
 April 2019 Caltech, *Algebraic Geometry seminar*  
 June 2019 Junior Participant Presentations, *PIMS Workshop on Arithmetic Topology*  
 Nov. 2019 Tata Inst. of Fundamental Research, Mumbai  
 Dec. 2019 ISI Kolkata, Colloquium  
 March 2021 University of Maryland, *Algebra-Number Theory seminar*  
 Nov. 2021 University of Copenhagen  
 Nov 2021 Utah Algebraic Geometry and Number Theory Seminar  
 Jan. 2022 Goethe-Universität, Institut für Mathematik  
 March 2022 Purdue University, *Topology seminar*  
 May 2022 University of Bath, *Number theory seminar*  
 Sept. 2022 IAS, *Postdoc Short talk*  
 Nov. 2022 Columbia University, *Algebraic Geometry and Number Theory seminar*  
 Nov. 2022 Princeton University, *Algebraic Geometry and Number theory seminar*

## Other talks

- March 2017 Pizza Seminar, *University of Chicago*  
 March 2019 Farb and Friends Students' Seminar, *University of Chicago*  
 Feb. 2020 Geometry Student Seminar, *University of Bonn*

- June 2020 Virtual Complex Geometry Informal Preprint Seminar  
 Nov 2020 TIFR Students' Seminar  
 Jan. 2021 Picard group of  $K_g$  for small  $g$ , after Greer, Li, and Tian, *Joint working group (Bonn-Paris): Moduli spaces of K3 surfaces and hyperkähler varieties.*

## Professional Services

- Referee Geometry and Topology, Advances in Mathematics  
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## Research visits and conferences

- August 2017 Stony Brook University *Hodge Theory, Moduli and Representation Theory*  
 June 2018 University of Chicago *The roots of topology: miracles of algebraic geometry, braids, and Hilbert's 13th problem*  
 Feb. 2019 IPAM, UCLA *Braids, Resolvent Degree and Hilbert's 13th Problem*  
 March 2019 University of Arizona, Tucson *Arizona Winter School 2019: Topology and Arithmetic*  
 June 2019 PIMS, Vancouver *Workshop on Arithmetic Topology*  
 Nov. 2019 TIFR, Mumbai *Research visit*  
 Dec. 2019 Indian Statistical Institute, Kolkata *Research visit*  
 Feb. 2020 Hausdorff Center for Mathematics *Perverse Sheaves in Enumerative Geometry*  
 Nov 2021 University of Copenhagen *Workshop on Homology and Homotopy of Configuration Spaces*  
 August 2022 TIFR, Mumbai *Research visit*  
 May 2022 University of Bath, Bath *Research visit*