

Oishee Banerjee

email: oishee.banerjee@fsu.edu

Office: LOV 313.
1017 Academic Way,
Department of Mathematics,
Florida State University.

Research Interests

My research interests lie at the intersection of algebraic geometry and algebraic topology. I employ a diverse array of techniques (from sheaf theory, homotopy theory, homological algebra, algebraic geometry, group actions and combinatorics) to study the topology of moduli spaces rooted in algebraic geometry, which oftentimes have 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, *Mathematische Zeitschrift*, Volume 308, article number 16, (2024)
- 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
- Moduli of curves on toric varieties and their stable cohomology, submitted
- A configuration space model for algebraic function spaces, preprint

Work in progress

- A categorical approach to Segal-type theorems, in preparation
- Stability in cohomology via the symmetric simplicial category, in preparation
- Moduli space of nondegenerate maps on a smooth projective curve, with Claudio Gómez-González, in preparation
- Unirationality of Hurwitz spaces of degree 4 branched covers of \mathbb{P}^1 with prescribed ramification and monodromy group D_4 , in preparation

Employment

August 2023– **Assistant Professor**, Florida State University, Tallahassee, USA

- September 2022–July 2023 **Postdoctoral Member**, *Institute for Advances Studies, School of Mathematics*, Princeton, NJ, USA
- August 2019–August 2022 **Postdoc**, *Hausdorff Centre for Mathematics*, Bonn, Germany

Education

- 2013–2019 **Ph.D, 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, Scholarships and Grants

- 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*)
- September 2022–July 2023 **NSF Grant No. DMS-1926686**, *Institute for Advanced*, Princeton

Teaching Experience

- 2024– Graduate Topology: Florida State University
- 2023–2024 Calculus 3: Florida State University
- 2015–2018 Math 131/2/3: Elementary Functions and Calculus I/II/III (Instructor), University of Chicago
- 2014–2015 Worked as TA for Kevin Corlette, George Glauberman, and Ridgeway Scott, University of Chicago
- Winter 2018 Grader for Graduate Algebraic Geometry, Madhav Nori, University of Chicago
- Spring 2017 Grader for Graduate Complex Analysis, Greg Lawler, University of Chicago
- 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 2025 University of Chicago, *No boundaries seminar*
- April 2025 University of Florida, *Algebra seminar*
- March 2025 Vanderbilt University, *Topology seminar*
- March 2025 University of Michigan, *Topology seminar*
- March 2025 Boston College, *Algebraic Geometry seminar*
- Jan 2025 FSU, *Topology seminar*
- June 2024 *Seminar on Manifolds, homotopy theory, and related topics* organised by Manuel Krannich, Alexander Kupers, and Oscar Randal-Williams (Zoom)
- July 2023 Purdue University, *Workshop on Stability in Topology, Arithmetic and Representation theory*
- April 2023 Institute for Advanced Study, *member colloquium*
- Jan 2023 Louisiana State University, *colloquium*
- Nov 2022 Princeton University, *Algebraic Geometry and Number theory seminar*
- Nov 2022 Columbia University, *Algebraic Geometry and Number Theory seminar*
- Sept 2022 IAS, *Postdoc Short talk*
- August 2022 Tata Inst. of Fundamental Research, Mumbai
- May 2022 University of Bath, *Number theory seminar*
- March 2022 Purdue University, *Topology seminar* (Zoom)
- Jan 2022 Goethe-Universität, Institut für Mathematik, *Algebraic Geometry seminar* (Zoom)
- Nov 2021 University of Utah, *Algebraic Geometry and Number Theory Seminar* (Zoom)
- Nov 2021 University of Copenhagen, Invited speaker at Workshop on Homological Stability
- March 2021 University of Maryland, *Algebra-Number Theory seminar* (Zoom)
- Dec 2019 ISI Kolkata, Colloquium
- Nov 2019 Tata Inst. of Fundamental Research, Mumbai, *Colloquium*
- June 2019 Junior Participant Presentations, *PIMS Workshop on Arithmetic Topology*
- April 2019 Caltech, *Algebraic Geometry seminar*
- April 2019 University of California, Irvine, *AG-Topology seminar*
- April 2019 Columbia University, *Topology seminar*

Other talks

- Feb 2025 FSU Intro to research seminar
- March 2024 FSU Intro to research seminar
- Jan. 2021 Expository talk on *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*.

- Nov 2020 TIFR Students' Seminar
- June 2020 Virtual Complex Geometry Informal Preprint Seminar
- Feb. 2020 Geometry Student Seminar, *University of Bonn*
- March 2019 Farb and Friends Students' Seminar, *University of Chicago*
- March 2017 Pizza Seminar, *University of Chicago*

Professional Services

- Sole organizer, Fall 2024-Spring 2025 Algebra seminar, Florida State University
- Referee Geometry and Topology, Advances in Math., IMRN, Proceedings of the AMS, Transactions of the AMS, Annales scientifiques de ENS, Crelle etc.

Research visits and conferences

- July 2023 Purdue University *Workshop on Stability in Topology, Arithmetic and Representation Theory*
- May 2022 University of Bath, Bath *Research visit*
- August 2022 TIFR, Mumbai *Research visit*
- Nov 2021 University of Copenhagen *Workshop on Homology and Homotopy of Configuration Spaces*
- Feb. 2020 Hausdorff Center for Mathematics *Perverse Sheaves in Enumerative Geometry*
- Dec. 2019 Indian Statistical Institute, Kolkata *Research visit*
- Nov. 2019 TIFR, Mumbai *Research visit*
- June 2019 PIMS, Vancouver *Workshop on Arithmetic Topology*
- March 2019 University of Arizona, Tucson *Arizona Winter School 2019: Topology and Arithmetic*
- Feb. 2019 IPAM, UCLA *Braids, Resolvent Degree and Hilbert's 13th Problem*
- June 2018 University of Chicago *The roots of topology: miracles of algebraic geometry, braids, and Hilbert's 13th problem*
- August 2017 Stony Brook University *Hodge Theory, Moduli and Representation Theory*