Abhishek Mallick

CONTACT INFORMATION

Rutgers University, New Brunswick

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RESEARCH INTERESTS

Low dimensional topology. Floer homology. Equivariant Floer homology. Khovanov homology.

EMPLOYMENT

Rutgers University, New Brunswick

Hill Assistant Professor, 2023 Spring-2025 Summer.

Mathematical Sciences Research Institute (SLMath), Berkeley

Postdoctoral Fellow Fall, 2022

Max-Planck-Institut für Mathematik, Bonn

Postdoctoral Research Fellow 2021-22

EDUCATION

Michigan State University

Ph.D. Mathematics 2021

- Advisor: Matthew Hedden

Ramakrishna Mission Vivekananda Educational and Research Institute, India

M.Sc. in Mathematics, 2015

PUBLICATIONS

Gompf's cork and Heegaard Floer homology *arXiv preprint* (with Dai, and Zemke).

Involutions and the Chern–Simons filtration in instanton Floer homology *arXiv preprint* (with Alfieri, Dai, and Taniguchi).

Exotic Dehn twists on 4-manifolds *arXiv preprint* (with Konno, and Taniguchi).

From diffeomorphisms to exotic phenomena in small 4-manifolds *arXiv preprint* (with Konno, and Taniguchi).

Rank-expanding satellites, Whitehead doubles, and Heegaard Floer homology *arXiv preprint* (with Dai, Hedden and Stoffregen).

The (2,1)-cable of the figure-eight knot is not smoothly slice *arXiv preprint* (with Dai, Kang, Park and Stoffregen).

Knot Floer homology and surgery on equivariant knots *arXiv preprint.*

Equivariant knots and knot Floer homology. To appear in the *Journal of Topology* (with Dai and Stoffregen).

Corks, Involutions, and Heegaard Floer Homolgy. To appear in the *Journal of the European Mathematical Society*, (with Dai and Hedden).

Invited Talks

Institute of Mathematics of the Polish Academy of Sciences, Simons Semester-Knots, Homologies and Physics, 2024

University of British Columbia, Topology seminar, 2024

MIT, Geometry and Topology seminar, 2024

UCLA, 2024 Geometry and Topology Workshop UCLA, 2024

Stony Brook University, Symplectic Geometry, Gauge Theory and Low-Dimensional Topology seminar, 2023

Columbia University, Geometric Topology seminar, 2023

University of Virginia, New Developments in 3- and 4-Manifold Topology, 2023.

University of Georgia, Geometry and Topology seminar, 2023.

Log Cabin Conference on Concordance and Knotted Surfaces, Arizona, 2023.

Rutgers University - New Brunswick, Geometry and Topology seminar, 2023.

Oberwolfach Workshop: Morphism in Low-dimensional topology, 2023 (unable to attend)

MIT, Geometry and Topology seminar, 2022.

Stanford University, Topology seminar, 2022.

MSRI, Berkeley, Floer homotopy theory program seminar, 2022.

Princeton University, Topology seminar, 2022.

IBS Center for Geometry and Physics, CGP seminar, 2022.

Max Planck Institute for Mathematics, Surfaces in 4-manifolds, 2022.

American Institute of Mathematics, Program on 4-manifolds, virtual, 2021.

American Mathematical Society, special session on the Topology and Geometry of 3- and 4-manifolds, at the AMS Southeastern Sectional Meeting, virtually at Georgia Tech 2021.

Joint Mathematics Meetings: AMS Special Session on Low Dimensional Topology, I (Associated with AMS Invited Maryam Mirzakhani Lecture), virtual conference, 2021.

Nearly Carbon Neutral Geometry Topology Conference, mini-session on 4-manifolds, virtual conference, 2020.

American Mathematical Society, Sectional Meeting; Special Session on Low-dimensional Topology, Purdue University (canceled), 2020.

University of Virginia, Geometry Seminar, 2020.

Graduate Student Topology and Geometry Conference, Indiana University Bloomington (postponed), 2020.

Honors and Awards

2010–2015	Jagadis Bose National Science Talent Search Scholarship.
2010–2015	Innovation in Science Pursuit for Inspired Research Fellowship, Department of Science and Technology, Govt.of India.
2016	Paul and Wilma Dressel Endowed Scholarship, MSU.
2016	College of Natural Science Dissertation Continuing Fellowship, MSU.
2018	Paul and Wilma Dressel Endowed Scholarship, MSU.
2020	Douglas A. Spragg Endowed Fellowship in Mathematics, MSU.
2020	College of Natural Science Dissertation completion Fellowship, MSU.

Teaching

Spring	2024	Primary Instructor, *Topics in Topology*, Graduate topics course in Floer homology
Fall	2023	Primary Instructor, two sections of Calculus I-(Differentiation and Integration)
Spring	2023	Primary Instructor, two sections of Calculus I-(Differentiation and Integration)
Summer	2016	Lecturer, Calculus II (Integration, Series, Sequence)
Fall	2016	Lecturer, Calculus II (Integration, Series, Sequence)
Spring	2017	Lecturer, Calculus IV (Differential Equation)
Summer	2017	Lecturer, Calculus IV (Differential Equation)
Fall	2017	Teaching Assistant, Transition to Proofs
Spring	2018	Teaching Assistant, Calculus III (Multivariable Calculus)
Fall	2018	Teaching Assistant, Calculus III (Multivariable Calculus)
Spring	2019	Grader, Graduate course on Algebraic Topology
Summer	2019	Lecturer, College Algebra
Fall	2019	Teaching Assistant, Calculus III (Multivariable Calculus)
Spring	2020	Teaching Assistant, Calculus III (Multivariable Calculus)

Undergraduate student supervision

Jay Patwardhan - Rutgers University (REU), Zheheng Xiao - Columbia University (REU)

Professional service

Referee for *Geometry & Topology*, *Advances in Mathematics*, *Journal of Topology*, *Algebraic & Geometric Topology*.

Mentor for an REU project (Rutgers University, Summer 2023) on the topic *Generalized Mazur pattern and Bordered Heegaard Floer homology*

ORGANIZATION

Co-organized Rutgers DIMACS REU, Summer 2023

Co-organized Postdoctoral Research Seminar on Floer homotopy theory, MSRI-SLMath, 2022

Nearly Carbon Neutral Geometry Topology Conference, co-organized a mini-session, virtual conference, 2021.

Weekly Departmental student Geometry and Topology seminar, MSU, 2017-2018.

Co-organized *Graduate Student Topology and Geometry Conference, MSU, 2017.*

OUTREACH

Mentor for a non-profit organization, *Padakshep*, based in India, which supports underprivileged meritorious school students with financial assistance and academic guidance.

Helped Quanta Magazine prepare a popular science article on one of my research work.