

## Abhishek Mallick

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| CONTACT<br>INFORMATION | <p>Rutgers University, New Brunswick</p> <p>Hill Center, Busch Campus, 110 Frelinghuysen Road Piscataway, NJ 08854, USA.</p> <p>Email: <a href="mailto:abhishek.mallick@rutgers.edu">abhishek.mallick@rutgers.edu</a></p>   |
| RESEARCH<br>INTERESTS  | <p>Low dimensional topology. Heegaard Floer homology. Seiberg-Witten Theory. Instanton Floer Homology. Khovanov homology.</p>   |
| EMPLOYMENT             | <p><b>Rutgers University, New Brunswick</b></p> <p>Hill Assistant Professor, 2023 Spring-2025 Summer.</p> <p><b>Mathematical Sciences Research Institute (SLMath), Berkeley</b></p> <p>Postdoctoral Fellow Fall, 2022</p> <p><b>Max-Planck-Institut für Mathematik, Bonn</b></p> <p>Postdoctoral Research Fellow 2021-22</p>  |
| EDUCATION              | <p><b>Michigan State University</b></p> <p>Ph.D. Mathematics 2021</p> <ul style="list-style-type: none"><li>• Advisor: Matthew Hedden</li></ul> <p><b>Ramakrishna Mission Vivekananda Educational and Research Institute, India</b></p> <p>M.Sc. in Mathematics, 2015, B.Sc in Mathematics 2013.</p>  |
| PUBLICATIONS           | <p><b>Corks, involutions, and Heegaard Floer Homology</b>, <i>Journal of the European Mathematical Society</i>, 25(6) (2023), 2319-2389. (with Dai and Hedden).</p> <p><b>Equivariant knots and knot Floer homology</b>. <i>Journal of Topology</i>, 16(3), (2023), 1167-1236 (with Dai and Stoffregen).</p> <p><b>Knot Floer homology and surgery on equivariant knots</b>, to appear in the <i>Journal of Topology</i>.</p> <p><b>The (2,1)-cable of the figure-eight knot is not smoothly slice</b>, to appear in the <i>Inventiones Mathematicae</i> (with Dai, Kang, Park, and Stoffregen).</p> <p><b>Rank-expanding satellites, Whitehead doubles, and Heegaard Floer homology</b>, (with Dai, Hedden, and Stoffregen), to appear in the <i>Journal of Topology</i>.</p> <p><b>From diffeomorphisms to exotic phenomena in small 4-manifolds</b>, arXiv: 2304.05997 (with Konno, and Taniguchi).</p> <p><b>Exotic Dehn twists on 4-manifolds</b>, arXiv: 2306.08607 (with Konno, and Taniguchi).</p> <p><b>Involutions and the Chern–Simons filtration in instanton Floer homology</b>, arXiv: 2309.02309 (with Alfieri, Dai, and Taniguchi).</p> |

**Gompf's cork and Heegaard Floer homology**, *International Mathematical Research Notices*, 2024, 18, 12663-12682 (with Dai and Zemke).

**On localizing groups of exotic diffeomorphisms of 4-manifolds**, arXiv: 2406.11773 (with Konno).

**A note on cables and the involutive concordance invariants**, arXiv: 2409.02192 (with Hendricks).

**Exotically knotted closed surfaces from Donaldson's diagonalization for families**, arXiv: 2409.07287 (with Konno, and Taniguchi).

## TEACHING

|        |      |  |
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| Spring | 2025 | Primary Instructor, Introduction to Mathematical Reasoning   |
| Fall   | 2024 | Primary Instructor, two sections of Calculus I-(Differentiation and Integration)                         |
| Spring | 2024 | Primary Instructor, <i>Floer Homology and Low-Dimensional Topology</i> , Graduate Topics Course Topology |
| Fall   | 2023 | Primary Instructor, two sections of Calculus I-(Differentiation and Integration)                         |
| Spring | 2023 | Primary Instructor, two sections of Calculus I-(Differentiation and Integration)                         |
| Spring | 2020 | Teaching Assistant, Calculus III (Multivariable Calculus)  |
| Fall   | 2019 | Teaching Assistant, Calculus III (Multivariable Calculus)  |
| Summer | 2019 | Primary Instructor, College Algebra  |
| Spring | 2019 | Teaching Assistant, Graduate course on Algebraic Topology  |
| Fall   | 2018 | Teaching Assistant, Calculus III (Multivariable Calculus)  |
| Spring | 2018 | Teaching Assistant, Calculus III (Multivariable Calculus)  |
| Fall   | 2017 | Teaching Assistant, Transition to Proofs   |
| Summer | 2017 | Primary Instructor, Calculus IV (Differential Equation)  |
| Spring | 2017 | Primary Instructor, Calculus IV (Differential Equation)  |
| Fall   | 2016 | Primary Instructor, Calculus II (Integration, Series, Sequence)  |
| Summer | 2016 | Primary Instructor, Calculus II (Integration, Series, Sequence)  |

## INVITED

## TALKS & VISITS

*Simons Center's Workshop: Gauge Theory and Floer Homology in Low Dimensional Topology, 2025*

*University of Michigan, Topology Seminar, 2025*

*Gauge Theory Virtual Seminar, 2025*

*Stanford University, Topology seminar, 2025*

*Rutgers Undergraduate Mathematical Association Seminar, 2024*

*University of Texas at Austin, visit, 2024*

*Link invariants and surfaces in 4-manifolds, AMS special session, University of Texas, San Antonio, 2024*

*Braids Reunion Workshop, ICERM, Brown University, 2024*

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

*University of British Columbia, Topology seminar, 2024 (unable to travel)*

*MIT, Geometry and Topology seminar, 2024*

*Gauge theory learning seminar, Rutgers University, 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, (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

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| 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.  |

#### UNDERGRADUATE STUDENT SUPERVISION

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

#### GRADUATE STUDENT SUPERVISION

Informal reading course on Heegaard Floer homology - Timothy Bates (Rutgers).

#### PROFESSIONAL SERVICE

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

Referee for *Advances in Mathematics*, *Algebraic & Geometric Topology*, *Compositio Mathematica*, *Geometry & Topology*, *Journal of Topology*, *K3 problem list*, *Selecta Mathematica*, *Transactions of the American Mathematical Society*.

#### ORGANIZATION

*Co-organizing a Special Session in Joint Mathematics Meetings (JMM), 2025- ‘Concordance and Cobordism in Low-dimensions’ with Maggie Miller and Ryan Stees*

*Co-organizing Rutgers Geometry and Topology weekly seminar, 2024*

*Co-organized Rutgers Gauge Theory, Low-Dimensional Topology, and Geometric Analysis Conference, 2024*

*Co-organized Rutgers DIMACS REU, Summer 2023*

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

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

*Co-organized weekly student Geometry and Topology seminar, MSU, 2017-2018.*

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

#### OUTREACH

Acted as a mentor for a non-profit organization, *Padakshep*, based in India, which supports underprivileged meritorious school students with academic guidance.