

Prasit Bhattacharya

Department of Mathematical Science
Science Hall 249
New Mexico State University
Las Cruces NM 88003

Email: prasit@nmsu.edu
Homepage: sites.google.com/view/prasit0605/

Research Interests

algebraic topology, homotopy theory, classical geometry, chromatic homotopy theory, stable homotopy theory, equivariant stable homotopy theory, algebraic K-theory, motivic homotopy theory

Education

PhD in Mathematics, Indiana University at Bloomington, 2015. Advisor Michael A. Mandell.

Master in Mathematics, Indian Statistical Institute at Bengaluru, 2009.

Bachelor in Mathematics, Indian Statistical Institute at Bengaluru, 2007.

Employment

Assistant Professor, New Mexico State University August 2022 – current.

Visiting Assistant Research Professor, University of Notre Dame, June 2020 – May 2022.

Whyburn Instructor, University of Virginia, July 2017 – May 2020.

Visiting Assistant Professor, University of Notre Dame, July 2015 – June 2017.

Program Associate, Algebraic topology program, M.S.R.I. Berkeley, January 2013 – May 2013.

Awards and grants

NSF Research Grant, DMS 2305016 (2023 – 2026)

Generalized Steenrod operations and equivariant geometry

NSF Conference Grants (co-PI) DMS 2305016 (2023 – 2024)

South Central Topology Conference III

NMSU College of Art & Science Travel Grant (Summer 2023)

James P. Williams memorial Award, 2010

Outstanding first year graduate student at Indiana University

M.Math honors fellowship, 2007 – 2009

Indian Statistical Institute, Bengaluru

B.Math honors fellowship, 2004 – 2007

Indian Statistical Institute, Bengaluru

Preprints and publications

1. *On the periodic v_2 -self-map of A_1* , Prasit Bhattacharya, Philip Egger and Mark E. Mahowald.
Algebraic & Geometric Topology 17 (2017), no. 2, 657 – 692.
2. *A class of 2-local finite spectra which admits v_2^1 -self-map*, Prasit Bhattacharya and Philip Egger.
Advances in Mathematics 360 (2020), 106895, 40.
3. *On the E_2 -term of the bo Adams spectral sequence*, Agnes Beaudry, Mark Behrens, Prasit Bhattacharya, Dominic Culver and Zhouli Xu.
Journal of Topology 13 (2020) 356– 415.
4. *Towards the $K(2)$ -local homotopy groups of Z* , Prasit Bhattacharya and Philip Egger.
Algebraic & Geometric Topology 20 (2020), no. 3, 1235–1277.
5. *The P_2^1 -Margolis homology of connective topological modular form*, Prasit Bhattacharya, Irina Bobkova and Brian Thomas.
Homology, Homotopy and Applications, Vol. 23 (2021), No 2, 379–402.
6. *The telescope conjecture at the height 2 and the tmf resolution*, Agnes Beaudry, Mark Behrens, Prasit Bhattacharya, Dominic Culver and Zhouli Xu.
Journal of Topology 14 (2021) no. 4, 1243–1320.
7. *The stable Adams conjecture and higher associative structures of Moore spectra*, Prasit Bhattacharya and Nitu Kitchloo.
Annals of Mathematics, 195 (2022), no. 2, 375–420.
8. *Higher associativity of Moore spectra*, Prasit Bhattacharya.
Advances in Mathematics, 402 (2022), 108319.
9. *An \mathbb{R} -motivic v_1 -self-map of periodicity 1*, Prasit Bhattacharya, Bertrand Guillou and Ang Li.
Homology, Homotopy and Applications Vol 24 (2022), No 1, 299–324.
10. *On realizations of the subalgebra $A^{\mathbb{R}}(1)$ of the \mathbb{R} -motivic Steenrod algebra*, Prasit Bhattacharya, Bertrand Guillou and Ang Li.
Transactions of the American Mathematical Society (Series B) 9 (2022), 700–732.
11. *On the EO-orientability of vector bundles*, Prasit Bhattacharya and Hood Chatham
Journal of Topology 15 (2022) no. 4, 2017–2044
12. *The stable Picard group of $A(2)$* , Prasit Bhattacharya and Nicolas Ricka.
<https://arxiv.org/abs/1702.01493>
13. *The structure of the v_2 -local algebraic tmf resolution*, Mark Behrens, Prasit Bhattacharya and Dominic Culver, <https://arxiv.org/abs/2301.11230> (Submitted)
14. *Equivariant orientations and Thom class for disconnected base spaces*, Prasit Bhattacharya and Foling Zou, <https://arxiv.org/abs/2303.10259>. (Submitted)
15. *On the Steenrod module structure of \mathbb{R} -motivic Spanier Whitehead duals*, Prasit Bhattacharya, Bertrand Guillou and Ang Li <https://arxiv.org/abs/2309.16142> (Submitted)

16. *Equivariant Steenrod operations*, Prasit Bhattacharya, Mingcong Zeng, and Foling Zou, Preprint (2023).
17. *The Atiyah Real Adams conjecture*, Prasit Bhattacharya and Hood Chatham, Preprint (2023)
18. *New infinite families in $T(2)$ -local stable stems*, Prasit Bhattacharya, Irina Bobkova, and JD Quigley, Preprint (2023).

Outside Algebraic topology

20. *Fractal Sets as Final Coalgebras Obtained by Completing an Initial Algebra*, Prasit Bhattacharya, Lawrence S. Moss, Jayampati Ratnayake and Robert Rose, **Horizons of mind: A tribute to Prakash Panangaden, Lecture notes in computer science**, volume 8448, 2014, pp.146-167.
21. *The p -adic integers as final coalgebra*, Prasit Bhattacharya, **Logic, Language, Information, and Computation, Lecture Notes in computer science**, volume 9160, 2015, pp.189-199

Invited Talks

Conference, workshop and colloquium talks

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| Midwest Topology Seminar
University of Illinois at Urbana Champaign
Title <i>Equivariant Steenrod Operations</i> | July 2023 |
| International Workshop on Algebraic Topology
Beijing International Center of Mathematical Research
Peking University
Title <i>Equivariant Steenrod Operations</i> | July 2023 |
| South Central Topology Conference –San Marcos
Texas State University
Title : <i>Equivariant Steenrod Operations</i> | February 2023 |
| Colloquium talk –Mumbai, India
Tata Institute of Fundamental Research
Title : <i>Equivariant Steenrod Operations</i> | January 2023 |
| Colloquium talk –Kolkata, India
Indian Statistical Institute
Title : <i>Equivariant Steenrod Operations</i> | January 2023 |
| Colloquium talk –Las Cruces
New Mexico State University
Title : <i>Rabbit holes of spheres</i> | September 2022 |
| Electronic Computational Homotopy theory
https://s.wayne.edu/echt/
Title : <i>Equivariant Steenrod Operations</i> | February 2022 |
| Colloquium talk –College Station
Texas A&M University
Title : <i>The Atiyah Real stable Adams conjecture</i> | October 2021 |

- Workshop on Homotopy theory and group theory**
Centre de Recerca Matemàtica, Barcelona July 2021
Title: *Equivariant cohomology operations*
- Spring Southeastern Sectional Meeting**
University of Virginia, Charlottesville March 2020
Title: *On the EO-orientations of vector bundles*
- Joint math meetings – Denver** January 2020
Colorado Convention Center
Title: *Revising Higher associativity of Moore spectra*
- Colloquium talk – Mumbai** December 2019
Tata Institute of Fundamental Research
Title: *On the stable Adams Conjecture*
- Colloquium talk – Hawaii** December 2019
University of Hawaii
Title: *Stable homotopy groups of spheres, finite CW-complexes and periodic self-maps*
- Electronic Computational Homotopy theory** January 2019
<https://s.wayne.edu/eht/>
Title: *On the EO-orientations of vector bundles*
- Chromatic homotopy theory- Journey to the frontier** May 2018
University of Colorado
Title: *On beyond Zebras*
- Electronic Computational Homotopy theory** October 2017
<https://s.wayne.edu/eht/>
Title: *The $K(2)$ -local homotopy of a type 2 complex Z*
- AMS Sectional** April 2017
Vanderbilt University
Title: *The P_2^1 -Margolis homology of tmf*
- AMS Sectional** April 2017
Indiana University
Title: *A very nice type 2 spectrum*
- Graduate Student Topology and Geometry Conference** April 2013
University of Notre Dame
Title: *Higher Associativity of Moore spectra*
- Workshop on motivic homotopy theory** March 2013
M.S.R.I.
Title: *Etale cohomology and Fundamental groups*

Seminar Talks

- Geometry & Topology seminar – **New Mexico State University** at Las Cruces
Title: *Equivariant orientation theory for disconnected base spaces* August 2023
- Topology seminar – **Indian Statistical Institute** at Kolkata
Title: *Atiyah Real Adams Conjecture* July 2023

Topology seminar – University of Oregon at Eugene Title: <i>Equivariant Steenrod Operations</i>	May 2023
Geometry, topology & dynamic seminar – University of Michigan at Ann Arbor Title: <i>Equivariant Steenrod Operations</i>	March 2023
Geometry & Topology seminar – New Mexico State University Title: <i>Higher homotopy associativity or \mathbb{A}_n-structures</i>	November 2022
Topology seminar – University of Virginia Title: <i>Equivariant orientation and Thom class for disconnected base space</i>	October 2022
Topology seminar – University of California Los Angeles Title: <i>Equivariant Steenrod Operations</i>	June 2022
Topology seminar – Southern University of Science and Technology, China Title: <i>Equivariant Steenrod Operations</i>	November 2021
Geometry seminar – Texas A&M University Title: <i>Equivariant Steenrod Operations</i>	October 2021
Topology seminar – University of Notre Dame Title: <i>Equivariant Steenrod Operations</i>	September 2021
Chicagoland algebraic topology seminar – Univ of Chicago/Northwestern Univ Title: <i>The stable Adams conjecture</i>	January 2021
Topology seminar – Texas A&M University Title: <i>The stable Adams conjecture</i>	September 2020
Topology seminar – University of Chicago Title: <i>Revisiting stable Adams conjecture</i>	January 2020
Topology seminar – Northwestern University Title: <i>Revisiting stable Adams conjecture</i>	January 2020
Topology seminar – Johns Hopkins University Title: <i>A 2-local finite spectrum that admit 1-periodic v_2-self-map</i>	October 2019
Topology seminar – University of Kentucky Title: <i>Revisiting higher associativity of Moore spectra</i>	September 2019
Topology seminar – University of Colorado Title: <i>P_2^1-Margolis homology of tmf</i>	December 2018
Topology seminar – Massachusetts Institute of Technology Title: <i>A 2-local type 3 spectrum, its periodic v_3-self-map, and its $K(3)$-local homotopy groups</i>	October 2018
Topology seminar – Princeton University Title: <i>Stable Adams conjecture and higher associative structure on Moore spectra</i>	April 2018
Algebraic topology seminar – University of Chicago Title: <i>A very nice type 2 spectrum</i>	January 2017
Topology seminar – University of Rochester Title: <i>A very nice type 2 spectra</i>	September 2016

Topology seminar – University of Virginia Title: <i>A very nice type 2 spectra</i>	September 2016
Topology seminar – Ohio State University Title: <i>A finite spectra admitting 1-periodic v_2-self-map</i>	April 2016
Topology seminar – Wayne State University Title: <i>A finite spectra admitting 1-periodic v_2-self-map</i>	March 2016
Topology seminar – University of Notre Dame Title: <i>Higher associativity of Moore spectra</i>	October 2015
Topology seminar – Purdue University Title: <i>Higher associativity of Moore spectra</i>	April 2016
Topology seminar – University of Chicago Title: <i>Higher associativity of Moore spectra</i>	October 2014
Topology seminar – Northwestern University Title: <i>Higher associativity of Moore spectra</i>	October 2014
Topology seminar – Johns Hopkins University Title: <i>Higher associativity of Moore spectra</i>	October 2014
Topology seminar – Indiana University Title: <i>Higher associativity of Moore spectra</i>	September 2014

Teaching experience

New Mexico State University

Calculus & Analytic Geometry I	Fall 2023
Calculus III	Fall 2023
Topology I	Spring 2023
Calculus & Analytic Geometry I	Fall 2022
Algebraic topology II	Fall 2022

University of Virginia

Calculus of Manifolds	Spring 2020
Linear Algebra	Spring 2020
Algebraic topology II	Fall 2019
Chromatic Homotopy Theory (topic course)	Spring 2019
Calculus III (2 sections)	Fall 2018
Calculus III (2 sections)	Spring 2018
Linear algebra	Fall 2017

University of Notre Dame

Linear algebra & Differential Equations (2 sections)	Spring 2017
Calculus III (2 sections)	Fall 2016
Calculus for Business major	Spring 2016
Finite Mathematics	Spring 2016
Calculus III	Fall 2015
Calculus I	Fall 2015

Indiana University Bloomington

Finite Mathematics	Summer 2015
Finite Mathematics	Fall 2014
Finite Mathematics (2 sections)	Fall 2012
Finite Mathematics (2 sections)	Spring 2012
Pre-calculus (2 sections)	Fall 2011
Finite Mathematics (1 sections)	Summer 2011

Mentorship*Postdoctorate*

Yang Hu	Fall 2023 –
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Graduate students

Alexander Waugh	Fall 2023 –
Aaron Stewart	Spring 2023 –
Mason Adams	Spring 2023 –

Undergraduate students

Soumya Dasgupta	Summer, 2023
Connor Malin	REU 2019
Trent Lucas	REU 2019
Edith Zhang	REU 2019
Yifan (Jasmine) Zao	2017 – 2018
Shirley (Qianshu) Liu	2017 – 2018

High school students

Hans Riess

2011 – 2013

Professional services*Committee member*

Majors and Minors committee, New Mexico State University

Fall 2022 – present

Scholarships, New Mexico State University

Fall 2022 – present

Social committee, New Mexico State University

Fall 2023 – present

Refereed for Journals

Proceedings of American Mathematical Society

Journal of American Mathematical Society

Algebraic & Geometric Topology

New York Journal of Math

*Reviewed papers (mathscinet) – 8***Co-organized**

South Central Topology Conference III, Las Cruces

October 2023

Special session in homotopy theory AMS Sectional, Omaha

October 2023

NMSU math problem of the week, New Mexico State University

Fall 2022 – current

NMSU Geometry & Topology seminar, New Mexico State University

Fall 2022 – current

Topology seminar, University of Notre Dame

Fall 2019 – Spring 2022

Arf-Kervaire invariant one problem (international reading course), eCHT

Fall 2020

Stable Equivariant Homotopy Theory (reading seminar), University of Virginia

Fall 2018

Computations in Stable homotopy theory (reading seminar), University of Virginia

Spring 2018

Topology seminar, University of Virginia

Fall 2017 – Fall 2020

Topology seminar, University of Notre Dame

Fall 2015 – Fall 2017

Equivariant Homotopy Theory (reading seminar), University of Notre Dame

Summer 2014

Graduate Student Topology Conference (G.S.T.C.), Indiana University

April 2012

Exotic spheres (reading seminar), Indiana University

Summer 2013

Student Topology Seminar, Indiana University

March 2010 - April 2013

Outreach and Volunteerism

NMSU-MÁS (Mejorando las Aulas en STEM/Improving STEM Classrooms)	Fall 2023 – current
Centennial Math Day, Centennial High School at Las Cruces	March 4, 2023
Trivial Loops – departmental social hiking event	Fall 2022 – present