

Hitesh Gakhar

POSTDOCTORAL ASSOCIATE, DEPARTMENT OF MATHEMATICS, THE UNIVERSITY OF OKLAHOMA

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Employment

Department of Mathematics, The University of Oklahoma

POSTDOCTORAL ASSOCIATE

Norman, OK, United States

August 2020 - present

Department of Mathematics, Michigan State University

GRADUATE ASSISTANT

East Lansing, MI, United States

August 2014 - December 2019

Education

Michigan State University

PH.D. IN MATHEMATICS

- Advisor: Jose Pera
- Dissertation: A topological study of toroidal dynamics

East Lansing, MI, United States

August 2014 - May 2020

Indian Institute of Science Education and Research - Mohali

B.S.-M.S. IN MATHEMATICS

- Advisor: Lingaraj Sahu
- Dissertation: Analysis of self adjoint operators

Mohali, Punjab, India

August 2009 - May 2014

Awards, Scholarships, & Grants

AWARDS & SCHOLARSHIPS

7. *Dissertation Completion Fellowship*, College of Natural Science, Michigan State University, Spring 2020
6. *Writing Fellowship*, The Graduate School, Michigan State University, September 2019
5. *Research Enhancement Award*, The Graduate School, Michigan State University, July 2019
4. *TA Award for Excellence in Teaching*, Department of Mathematics, Michigan State University, April 2019
3. *Dr. Paul and Wilma Dressel Endowed Scholarship*, Department of Mathematics, Michigan State University, April 2019
2. *IAS-INSANA Summer Research Fellowship*, May-July 2012, Granted by: Indian Academy of Sciences, Indian National Science Academy, & The National Academy of Sciences, India
1. *INSPIRE Fellowship*, August 2009-May 2014, Granted by: Department of Science and Technology, Ministry of Science and Technology, India

TRAVEL GRANTS

3. *Travel Grant to the JMM 2020*, American Mathematical Society, November 2019
2. *Travel Award*, The Graduate School, Michigan State University, October 2019
1. *Travel Grant to the AMS Sectional Meeting*, American Mathematical Society, August 2019

Publications

PREPRINTS

1. **Hitesh Gakhar** and Jose A. Perea, *Sliding window persistence of quasiperiodic functions*, In: (March 08, 2021). [Preprint, arXiv:2103.04540](#), [math.AT, cs.CG, math.DS]
2. Joseph M. Melby, **Hitesh Gakhar**, and Jose A. Perea, *Persistent Lifts to p -Primary Coefficients*, Submitted
3. **Hitesh Gakhar** and Jose A. Perea, *Künneth Formulae in Persistent Homology*, In: (October 12, 2019). [Preprint, arXiv:1910.05656](#), [math.AT, cs.CG]

IN PREPARATION

1. **Hitesh Gakhar**, Joshua L. Mike, Jose A. Perea, and Luis Polanco, *Stability of multiscale $K(G,1)$ coordinates*, in preparation, [math.AT, cs.CG]

Talks & Posters

INVITED TALKS

4. *Künneth Formulae in Persistent Homology*, Redbud Topology Conference, The University of Oklahoma, November 8, 2020
3. *A topological analysis of quasiperiodicity using persistent Künneth formulae*, Machine Learning Seminar, University of Ottawa, February 28, 2020
2. *Persistent homology and quasi-periodicity in time series data*, Topology, Analysis and Geometry Seminar, Central Michigan University, October 11, 2019
1. *Quasiperiodicity, Sliding Window Embeddings and the Künneth theorems*, Topology, Geometry and Data Analysis Seminar, The Ohio State University, Columbus, October 1, 2019

CONTRIBUTED TALKS: CONFERENCES AND WORKSHOPS

1. *Sliding window persistence of quasiperiodic functions*, Topological Data Analysis Workshop, The Institute for Mathematical and Statistical Innovation, Chicago, April 30, 2021
2. *A theoretical analysis of quasiperiodicity using persistent Künneth formulae*, AATRN-ATMCS, January 12, 2021
3. *A theoretical analysis of quasiperiodicity using persistent Künneth formulae*, Algebraic Topology: Methods, Computation, and Science (Postponed due to COVID-19), The Ohio State University, Columbus, June 2020
4. *Sliding Window Embeddings of quasiperiodic functions*, AMS Contributed Paper Session on Topology and Knot Theory, Joint Mathematics Meeting, Denver, January 16, 2020
5. *Sliding Window Embeddings of quasiperiodic functions*, AMS Sectional Meeting, University of Florida, Gainesville, November 3, 2019
6. *Künneth Formulae in Persistent Homology*, AMS Sectional Meeting, University of Wisconsin, Madison, September 15, 2019
7. *Künneth Formulae in Persistent Homology*, First Midwest student conference: Geometry and Topology meet data analysis and machine learning, The Ohio State University, Columbus, June 2, 2019
8. *Künneth Formulae in Persistent Homology*, 17th Graduate Student Topology and Geometry Conference, University of Illinois at Urbana Champaign, March 30, 2019
9. *Künneth Formulae in Persistent Homology*, Knots in Washington XLVII, George Washington University, Washington D.C., January 21, 2019
10. *Künneth Formulae in Persistent Homology*, AMS Contributed Paper Session on General Topology, Algebraic Topology, and Topology of Manifolds, Joint Mathematics Meeting, Baltimore, January 17, 2019

11. *Persistent Künneth Formula (Poster)*, Theory and Foundations of TGDA, The Ohio State University, Columbus, May 21, 2018
12. *Sliding window embeddings of quasiperiodic functions*, 16th Graduate Student Topology and Geometry Conference, University of Illinois at Chicago, April 8, 2018

CONTRIBUTED SEMINARS

1. *A topological analysis of quasiperiodicity using persistent Künneth formulae*, Topology and Data Science Seminar, Department of Mathematics, The University of Oklahoma, October 20, 2020
2. *A topological analysis of quasiperiodicity using persistent Künneth formulae*, Graduates Reminisce Online On Topology (GROOT) Summer Seminar, July 31, 2020
3. *Topology and Toroidal Dynamics*, Topological Data Analysis Seminar, Department of Computational Mathematics Science & Engineering, Michigan State University, April 13, 2020
4. *Sliding window embeddings of quasiperiodic functions*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, March 13, 2019
5. *Künneth Formulae in Persistent Homology*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, November 14, 2018
6. *Dualities in Persistent Cohomology*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, January 17 & 24, 2018
7. *Persistent Homology*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, April 13, 2017
8. *Serre Spectral sequences*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, November 19, 2015

OTHER TALKS

1. *(Intro to) Sliding Window Persistence*, Tutorial-a-thon, AATRN-WinCompTop, April 2021
2. *A topological study of toroidal dynamics*, Ph.D. Dissertation Defense, Department of Mathematics, Michigan State University, April 20, 2020
3. *Analysis of Self Adjoint Operators (Poster)*, M.S. Thesis Poster Presentations, Indian Institute of Science Education and Research Mohali, April 12, 2014
4. *Analysis of Self Adjoint Operators*, M.S. Thesis Mid-Year Presentation, Indian Institute of Science Education and Research Mohali, November 27, 2013
5. *Google PageRank*, Mathematics Club, Indian Institute of Science Education and Research Mohali, February 14, 2012

Conference Organization

15th Graduate Student Topology and Geometry Conference

MICHIGAN STATE UNIVERSITY

East Lansing, MI

April 8-9, 2017

Teaching

COURSES TAUGHT AS THE INSTRUCTOR-OF-RECORD

MATH 3980: Honors Research

SUMMER 2021

The University of Oklahoma

MATH 3333: Linear Algebra I

SPRING 2021

The University of Oklahoma

MATH 2443: Calculus and Analytic Geometry IV

FALL 2020

*The University of Oklahoma***MTH 299: Transitions**

FALL 2019, FALL 2018, SUMMER 2018

*Michigan State University***MTH 235: Differential Equations**

SUMMER 2016, SPRING 2016

*Michigan State University***MTH 234: Calculus III**

SUMMER 2017

*Michigan State University***MTH 133: Calculus II**

SPRING 2019

*Michigan State University***MTH 132: Calculus I**

SUMMER 2019

*Michigan State University***MTH 124: Survey of Calculus I**

SUMMER 2015

*Michigan State University***COURSES TAUGHT AS THE RECITATION INSTRUCTOR****MTH 299: Transitions**

SPRING 2017

*Michigan State University***MTH 234: Calculus III**

FALL 2016

*Michigan State University***MTH 133: Calculus II**

FALL 2015, SPRING 2015, FALL 2014

*Michigan State University***TEACHING LEADERSHIP****Lead Teaching Assistant, Mathematics Learning Center**

SPRING 2019, SPRING 2017, FALL 2016, SPRING 2016

Duties: Supervising the Mathematics Learning Center, Observing Under-graduate and Graduate tutors

*Michigan State University***Lead Teaching Assistant, Center for Instructional Mentoring, Duties**

SPRING 2019, SPRING 2018, SPRING 2017, FALL 2016

Duties: Observing Graduate Teaching Assistants for 'Calculus III' and 'Differential equations', Providing feedback, One on one mentoring, Conducting exam reviews for 'College Algebra'

*Michigan State University***Teaching Observation Assistant,**

FALL 2019, FALL 2018, FALL 2017

Duties: Observing Undergraduate Learning Assistants & Graduate Teaching Assistants, Providing feedback

*Michigan State University***Overall coordinator for summer B**

SUMMER 2017

Duties: Supervising instructors teaching 100-level and 200-level courses, One on one mentoring for a first time Graduate Teaching Assistant, Observations & feedback

*Michigan State University***Academic Service**

1. *Member*, Interdisciplinary Committee, Department of Mathematics, The University of Oklahoma, September 2020 - present

2. *Member*, Math Club Committee, Department of Mathematics, The University of Oklahoma, September 2020 - present
3. *Member*, Awards Committee, College of Natural Science Student Advisory Council, August 2019 - May 2020
4. *Mathematics Representative*, College of Natural Science Student Advisory Council, August 2019-May 2020
5. *Graduate Student Representative*, Graduate Program Subcommittee, Strategic Planning Committee, Department of Mathematics, Michigan State University, February 2019-April 2019
6. *Graduate Student Representative*, Graduate Studies Committee, Department of Mathematics, Michigan State University, August 2018-July 2019
7. *Organizer*, Graduate Student Geometry & Topology Seminar, Department of Mathematics, Michigan State University, Spring 2018

Professional Affiliations

1. Member of the Applied Algebraic Topology Research Network, December 2018-present
2. Member of the Association of Women in Mathematics, Student Chapter, Michigan State University, February 2018 - 2020
3. Member of the American Mathematical Society, 2014- 2020
4. Member of the Mathematical Association of America, 2015-2016

References

Available on request