

Curriculum Vitae

Sriram Raghunath
Department of Mathematics
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Education

PhD in Mathematics (2020 - present), Rutgers University, New Brunswick, NJ

Advisor: Kristen Hendricks

Integrated BS MS degree in Mathematics (2015 - 2020), Indian Institute of Science Education and Research (IISER Pune), India

Master's thesis supervisor: Tejas Kalelkar

Cumulative GPA - 9.9/10

Higher Secondary School Certificate (12th grade, 2015), Fr. Agnel Multipurpose High School and Junior College, Vashi
Percentage - 96.62%

Secondary School Certificate (10th grade, 2013), St. Lawrence High School, Vashi
Percentage - 96.55%

Research interests

I am interested in homological knot invariants, specifically in symplectic Khovanov homology, Heegard Floer homology, Khovanov homology, and their applications to finding invariants of knots and surfaces in 3 and 4 dimensional manifolds. I am also interested in periodic and strongly invertible links and their applications to finding exotic pairs.

Publications

Bounds on Pachner moves and systoles of cusped 3-manifolds Tejas Kalelkar and Sriram Raghunath, Accepted in Journal of Algebraic & Geometric Topology, arXiv 2007.02781

We proved that any two triangulations of a cusped hyperbolic 3-manifold are related by a bounded number of Pachner moves, which gives an algorithm to recognize cusped hyperbolic 3-manifolds including knot and link complements.

Teaching

At Rutgers University

- **Fall 2022** Teaching Assistant for Math 151 (Calculus I)
- **Spring 2022** Teaching Assistant for Math 244 (Differential Equations for Engineers)
- **Fall 2021** Teaching Assistant for Math 251 (Multivariable Calculus)
- **Spring 2021** Grader for Math 432 (Differential Geometry) and Math 103 (Mathematics for the Liberal Arts)
- **Fall 2020** Grader for Math 300 Honors section (Introduction to Mathematical Reasoning) and Math 351 (Abstract Algebra)

Reading and Research Projects undertaken

- **Oral qualifying exam** Passed oral qualifying exam in February 2022; syllabus includes Algebraic Topology, Knot Theory, 4-manifolds and Kirby Calculus, and Riemann Surfaces
- **Hyperbolic geometry, knot theory and 3-manifolds** (May 2020, Master's thesis with Tejas Kalelkar, IISER Pune):
- **Classification of surfaces** (Summer 2018, with Clara Löh, University of Regensburg): Partially implemented the proof of the classification of surfaces in the computer proof assistant Isabelle.
- **Expander Graphs and Ramanujan Graphs** (Summer 2017, with Krishna Kaipa, IISER Pune)

Talks

- October 2022, Graduate Geometry and Topology seminar – *Hyperbolic knot theory*
- February 2022, Graduate Geometry and Topology Seminar – *Various constructions of the Poincare homology sphere*
- November 2021, Rutgers Topology Learning Seminar - *The triangulation conjecture and homology cobordism*
- October 2021, Rutgers Topology Learning Seminar - *The Wild World of 4-manifolds*
- April 2021, Rutgers Pizza Seminar - *Escher's Circle Limit: Exploring hyperbolic tessellations*
- December 2020, Rutgers Pizza seminar Five Minute Talk - *Various proofs of the irrationality of square root of 2*
- March 2020, IISER Pune Math Club - *What is hyperbolic geometry?*
- April 2019, IISER Pune Math Club - *On the applications of the Borsuk-Ulam theorem to combinatorics*

Conferences and Schools

- Floer Homotopical Methods in Low Dimensional and Symplectic Topology, MSRI/SLMath, November 2022
- New Four Dimensional Gauge Theories, MSRI/SLMath, October 2022
- PIMS Summer School - Floer Homotopy Theory, July 2022
- GTA Philly Conference, Temple University, May 2022
- Cornell Topology Festival, Cornell, May 2022
- Graduate Student Topology and Geometry Conference, Georgia Tech, April 2022
- Tech Topology Conference, Georgia Tech, December 2021
- Tech Topology Summer School on 4-manifolds, Georgia Tech, July 2021
- MSRI summer school on Gauge Theory in Geometry and Topology, July 2021
- Conference on Geometric Topology, Bhaskaracharya Pratishthana, Pune, Dec 2019
- Advanced Instructional School (AIS) on Riemannian Geometry (Kähler Manifolds and Calabi-Yau conjectures), IISc Bangalore, July 2019
- Volume Conjecture and related topics in Knot Theory, IISER Pune, December 2018

Seminar organization and service

At Rutgers University

- I am a co-organizer of the Graduate Geometry and Topology Seminar
- I am a member of the Graduate Liaison Committee
- I co-organized the Rutgers Pizza seminar for the academic year 2021-22

At IISER Pune

Co-organized learning seminars in algebraic topology and algebraic geometry for the IISER Pune Math Club

Awards and achievements

- Was awarded the Rutgers Academic Excellence Award in Spring 2021 for the best performance on the Spring 2021 Written Qualifying Exam
- Was awarded the Gold Medal by IISER Pune in 2020 for the best academic performance in my cohort in the Integrated BS MS degree
- Was awarded the DAAD WISE scholarship by the German organization DAAD to pursue a summer project at the University of Regensburg, Germany in the summer of 2018.
- Was awarded the IISER Pune's academic excellence prize for exemplary performance in 2016 and 2018.
- Was awarded the INSPIRE scholarship – a scholarship to encourage undergraduate talent in science - by the Indian Government.
- Stood second in my city in the 12th grade board exams conducted by the Maharashtra state board.
- Qualified the National Talent Search Exam (NTSE) - a nationwide scholarship exam conducted by the government in 10th grade - and received scholarship.

Outreach and Extra-curricular activities

- Was the General Coordinator (2018-19) of Disha, an organization which works for the education and welfare of underprivileged children. Was an active part of Disha from 2015-2020 in various other roles like coordinating *Abhyasika* (a program which helps educate children from nearby settlements) and *Pahal* (Disha's annual magazine).
- Was selected to be part of the Indian Youth Delegation to China (May 2017). This programme aimed to facilitate cultural exchange between the youth of India and China and to expose us to the rich culture and history of China.
- Have learnt Indian classical music (Carnatic music) from the age of six. Have won many singing competitions and performed in many concerts.

Referees

Kristen Hendricks
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