Mitul Islam

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Research Interests

I am interested in *geometric structures on manifolds*, *discrete subgroups of Lie groups* and *geometric group theory*.

My current research focuses on *convex projective structures*, *Hilbert geometries* and various *weak hyperbolicity* phenomena in such geometric structures. I am also interested in *Anosov representations* and their generalizations.

Education

Heidelberg University   *Postdoctoral Researcher*
Research Station Geometry and Dynamics   *(2021- Present)*
Mentor: Beatrice Pozzetti

University of Michigan   *Ph.D. (2016- 2021)*
Dissertation: Rank one phenomena in convex projective geometry
Advisor: Ralf Spatzier

Indian Statistical Institute   *M. Math (2014-2016)*
Thesis: Non-commutative Geometry of Baumslag-Solitar group BS(1,-1)   *P.C.Panser Gold Medal*

Jadavpur University   *Bachelor of Science (2011-2014)*
Mathematics (Honours)   *University Gold Medal*

Publications and Preprints

1. *Convex co-compact groups with one dimensional boundary faces*
   Joint with Andrew Zimmer.
   Submitted. Available at: `arxiv:2104.05056`

2. *Convex co-compact representations of 3-manifold groups*
   Joint with Andrew Zimmer.
   Submitted. 40 pages. Available at: `arXiv:2009.05191`

3. *Rank-one Hilbert geometries.*
   Submitted. 34 pages. Available at: `arXiv:1912.13013`.

4. *Convex co-compact actions of relatively hyperbolic groups.*
   Joint with Andrew Zimmer.
   Geometry & Topology (accepted). 68 pages. Available at: `arXiv:1910.08885`

5. *A flat torus theorem for convex co-compact actions of projective linear groups.*
   Joint with Andrew Zimmer.
   Journal of the London Mathematical Society (accepted). 20 pages. Available at: `arXiv:1907.03277`

Awards and Achievements

Rackham Predoctoral Fellowship, University of Michigan	2020-2021
Rackham One-Term Dissertation Fellowship, University of Michigan	2020
Mathematics Department Fellowship, University of Michigan	2019
Mathematics Department Fellowship, University of Michigan	2018
Alice Weber Glover in Math Scholarship, University of Michigan	2017
P. C. Panser Gold Medal, Indian Statistical Institute, India	2017
Kishore Vaigynaik Protsahan Yojana, Govt. of India	2010-2016
Masters' scholarship, National Board of Higher Mathematics, India	2014
University Gold Medal, Jadavpur University, India	2014

Invited Talks

Colloquium, Indian Statistical Institute, Kolkata, India	December 2021
Young Researcher's Meeting of the GDR Platon, CIRM - Marseille	November 2021
Topology and Geometric Group Theory Seminar, Ohio State University	November 2021
Arbeitsgemeinschaft: Thin Groups and Super-strong Approximation, Oberwolfach	October 2021
Geometry Seminar, University of Virginia	March 2021
Geometry Seminar, Indiana University Bloomington	December 2020
McGill Geometric Group Theory Seminar, McGill University	November 2020
MSRI, Random and Arithmetic Structures in Topology (virtual semester)	November 2020
Nearly Carbon Neutral Geometric Topology Conference (NCNGT)	June 2020
Geometry and Topology Seminar, Louisiana State University (*cancelled*)	March 2020
Topology Seminar, University of Texas, Austin	November 2019
Indian Statistical institute, Kolkata, India	January 2019
Indian Statistical institute, Kolkata, India	July 2017

Teaching

I have taught 6 semesters at the **University of Michigan** as the **primary instructor**, following Inquiry Based Learning (IBL) philosophy.

Math 115 Differential Calculus (5 semesters): Fall 2019, Fall 2018, Winter 2018, Fall 2017, Winter 2017.

Math 105 Pre-calculus (1 semester): Fall 2016.

Mentoring

Laboratory of Geometry - LoG(M), University of Michigan (January-April 2020)
Project: *Entropy degeneration of ideal projective pants*

Role: Co-mentored a group of three undergraduate students, alongside two faculty mentors Harrison Bray and Giuseppe Martone. Helped run lectures and discussion sessions. Contributed in the discussion sessions on the computational/ coding component of the project.

Outreach

Organizer: **Department of Applied Mathematics, University of Calcutta, India** (December 2021)
Title of the talk: *Hyperbolic Geometry and Beyond - An Algebraic and Dynamical Perspective*

Acted as a resource person and gave a talk at a webinar organized by University of Calcutta on December 2021. The webinar was targeted towards young students with a goal towards motivating them for mathematics and research.

SERVICE

Heidelberg University

Differential Geometry seminar (co-organizer)   October 2021 - Present

University of Michigan

Learning seminar (*"Super-rigidity of higher rank lattices"*)   February - June 2020
Learning seminar (*"Benoist's work on convex divisible sets"*)   February - April 2019
Student Geometry/ Topology seminar (co-organizer)   January 2019 - April 2020
Student Dynamics seminar (co-organizer)   January 2019 - April 2020

WORKSHOPS AND CONFERENCES

Young researchers meeting of the GDR Platon	November 2021
Arbeitsgemeinschaft: Thin Groups and Super-approximation	October 2021
Random and Arithmetic Structures in Topology (Virtual Semester), MSRI	Fall 2020
Geometric group theory without boundaries (virtual)	July 2020
Nearly Carbon Neutral Geometric Topology Conference 2020, Virtual Conference	June 2020
Midwest Dynamical Systems 2019, University of Illinois at Chicago	November 2019
Aspects of geometric group theory, Institut des Hautes Etudes Scientifiques (IHES), Paris, France	July 2019
Perspectives on convex projective geometry, Séte, France	June 2019
Probabilistic methods in negative curvature, International Center for Theoretical Sciences, Bengaluru, India	March 2019
Thematic program on Teichmüller theory and its connections to geometry, topology and dynamics, Toronto, Canada	August 2018
Workshop on groups, geometry and dynamics, Uruguay.	July 2018
New methods for Zimmer's conjecture, Institute for Pure and Applied Mathematics (IPAM), Univ. of California, Los Angeles.	January 2018
Third GEAR Networks (Junior) Retreat. Stanford University.	August 2017
Houston summer school on dynamical systems, University of Houston.	May 2017