

G211, Max Planck Institute for Mathematics in the Sciences
Inselstraße 22, Leipzig 04103, Germany

Email: mitul.islam@mis.mpg.de
mitul.islam@gmail.com

Website: <https://mitul-islam.github.io/>

RESEARCH INTERESTS

- Geometric structures on manifolds, moduli spaces, and group actions preserving geometric structures
- Discrete subgroups of Lie groups
- Non-positive curvature and geometric group theory
- Local and global rigidity of group actions on compact manifolds (e.g. boundaries)

EMPLOYMENT

Max Planck Institute for Mathematics in the Sciences
Division: Geometry, Groups, and Dynamics (led by Anna Wienhard)

Postdoctoral Researcher
(October 2023- Present)

Universität Heidelberg
Research Station Geometry and Dynamics
Mentor: Beatrice Pozzetti

Postdoctoral Researcher
(2021- 2023)

EDUCATION

University of Michigan
Dissertation: Rank one phenomena in convex projective geometry
Advisor: Ralf Spatzier

Ph.D. (2016- 2021)

Indian Statistical Institute
Thesis: Non-commutative Geometry of Baumslag-Solitar group $BS(1,-1)$

M. Math (2014-2016)
P.C.Panzer Gold Medal

Jadavpur University
Mathematics (Honours)

Bachelor of Science (2011-2014)
University Gold Medal

PUBLICATIONS AND PREPRINTS

1. *A flat torus theorem for convex co-compact actions of projective linear groups.* [ArXiv 1907.03277](#)
Joint with Andrew Zimmer.
Journal of the London Mathematical Society (2021) Vol 3 Issue 2 470-489 (19 pages).
2. *Convex co-compact actions of relatively hyperbolic groups.* [ArXiv 1910.08885](#)
Joint with Andrew Zimmer.
Geometry & Topology 27 (2023) 417-511 (95 pages).
3. *Rank one Hilbert geometries.* [ArXiv 1912.13013](#)
To appear in **Geometry & Topology** (72 pages).
4. *Convex co-compact representations of 3-manifold groups.* [ArXiv 2009.05191](#)
Joint with Andrew Zimmer.
To appear in the **Journal of Topology** (48 pages).
5. *Convex co-compact groups with one dimensional boundary faces.* [ArXiv 2104.05056](#)
Joint with Andrew Zimmer.
Submitted (24 pages). Available on ArXiv.

6. *The structure of relatively hyperbolic groups in convex real projective geometry.* [ArXiv 2203.16596](#)
Joint with Andrew Zimmer.
Submitted (31 pages). Available on ArXiv.
7. *Boundary actions of lattices and C^0 local semi-rigidity.* [ArXiv 2303.00543](#)
Joint with Chris Connell, Thang Nguyen, and Ralf Spatzier.
Submitted (61 pages). Available on ArXiv.

OTHER WRITINGS

Preliminaries on dynamics on geometrically finite hyperbolic manifolds.

Oberwolfach Report No. 50/2021, pages 2732-2734. ([link](#))

Arbeitsgemeinschaft (Thin groups and Super-approximation), October 2021.

PROJECTS IN PREPARATION

1. *Morse-ness in convex projective geometry.*
Joint with Theodore Weisman.
2. *Relatively Anosov representations, Geometric Finiteness, and Convex Projective Structures.*
Joint with Feng Zhu.

AWARDS AND ACHIEVEMENTS

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

TALKS

MINI-COURSES

Mini-course (3-part, 4.5 hours) at the conference <i>Groups and Rigidity Around Zimmer Program</i> (GRAZP Conference), Ventotene, titled “ Actions of lattices on boundaries ”	Sept. 2023
Lecture series (3-part, 3 hours) titled “ Convex Projective Structures ”, Indian Statistical Institute - Kolkata, India	Dec. 2022

CONFERENCE TALKS

<i>Actions of large groups, geometric structures, and the Zimmer program:</i> Workshop as part of the thematic trimester on Zimmer program, Institut Henri Poincare (IHP) Paris	June 2024 ¹
Arbeitsgemeinschaft: Thin Groups and Super-strong Approximation, Oberwolfach	Oct. 2021
Nearly Carbon Neutral Geometric Topology Conference (NCNGT) (virtual talk)	June 2020

¹ upcoming

INVITED SEMINAR TALKS

Colloquium, Tata Institute of Fundamental Research (TIFR), Mumbai, India	April 2024 ¹
Groups and dynamics seminar, Univ. of Texas-Austin	Feb. 2024
Geometry seminar, Univ. of Wisconsin-Madison	Jan. 2024
Geometric group theory seminar, Ohio State Univ.	Jan. 2024
Geometry seminar, University of Michigan	Jan. 2024
Geometry seminar, Indian Institute of Science (IISc), Bangalore, India	March 2023
Seminar, Tata Institute of Fundamental Research (TIFR), Bangalore, India	March 2023
Colloquium, Tata Institute of Fundamental Research (TIFR), Mumbai, India	March 2023
Seminar, Indian Institute of Technology (IIT) - Mumbai, Mumbai, India	March 2023
Geometriy seminar, Florida State University	Nov. 2022
Geometric Analysis seminar, IIT Mumbai, India	Nov. 2022
Ergodic Theory seminar, Institut de Recherche Mathematique de Rennes IRMAR, Rennes	May 2022
Colloquium, Indian Statistical Institute Kolkata, India	Dec. 2021
Young Researcher's Meeting of the GDR Platon, CIRM - Marseille	Nov. 2021
Topology and Geometric Group Theory Seminar, Ohio State University	Nov. 2021
Geometry Seminar, University of Virginia	March 2021
Geometry Seminar, Indiana University Bloomington	Dec. 2020
McGill Geometric Group Theory Seminar, McGill University	Nov. 2020
MSRI, Random and Arithmetic Structures in Topology (virtual semester)	Nov. 2020
Topology Seminar, University of Texas, Austin	Nov. 2019
Indian Statistical institute, Kolkata, India	Jan. 2019
Indian Statistical institute, Kolkata, India	July 2017

TEACHING

At **Universität Heidelberg** and as the **primary instructor**:

Matrix Groups ([Course webpage](#)) Summer 2023

At the **University of Michigan** and as the **primary instructor**:

<i>Math 115 Differential Calculus</i>	Fall 2019
<i>Math 115 Differential Calculus</i>	Fall 2018
<i>Math 115 Differential Calculus</i>	Winter 2018
<i>Math 115 Differential Calculus</i>	Fall 2017
<i>Math 115 Differential Calculus</i>	Winter 2017
<i>Math 105 Pre-calculus</i>	Fall 2016

MENTORING

Laboratory of Geometry - LoG(M), University of Michigan (January-April 2020)

Project: *Entropy degeneration of ideal projective pants*

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

- **Celebrating the Poincaré Conjecture** (Millenium Prize Problems Mathfest, Heidelberg University, July 2022)
Event: A set of public events and lectures on the Poincaré conjecture aimed at the general public. Workshops were organized for school students.
Role: Worked in the team that created the [website](#) (aimed at explaining the Poincare conjecture to the public) and helped with the rest of the aspects of the event organization.
- Public webinar titled **Hyperbolic Geometry and Beyond - An Algebraic and Dynamical Perspective** (Department of Applied Mathematics, Calcutta University, December 2021)
Event: A webinar was targeted towards young students with a goal towards motivating them for mathematics and research.
Role: Acted as a resource person and gave a talk at a webinar organized by University of Calcutta on December 2021.

SERVICE AND ORGANIZATION

Reviewer Mathematische Zeitschrift

Quick Opinions Commentarii Mathematici Helvetici

Organization (Heidelberg University)

Differential Geometry seminar (co-organizer)

October 2021 - July 2023

Organization (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