Mitul Islam

Curriculum Vitae

G211, Max Planck Institute for Mathematics in the Sciences
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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 — *Postdoctoral Researcher (October 2023- Present)*
Division: Geometry, Groups, and Dynamics (led by Anna Wienhard)

Universität Heidelberg — *Postdoctoral Researcher (2021- 2023)*
Research Station Geometry and Dynamics
Mentor: Beatrice Pozzetti

Education

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 actions of relatively hyperbolic groups.* ArXiv 1910.08885
   Joint with Andrew Zimmer.
   Geometry & Topology 27 (2023) 417-511 (95 pages).
2. *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).
3. *Rank-one Hilbert geometries.* ArXiv 1912.13013
   Submitted (34 pages). Available on ArXiv.
4. *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.
5. *The structure of relatively hyperbolic groups in convex real projective geometry.* ArXiv 2203.16596
   Joint with Andrew Zimmer.
   Submitted (31 pages). Available on ArXiv.

6. *Convex co-compact groups with one dimensional boundary faces.* ArXiv 2104.05056
   Joint with Andrew Zimmer.
   Submitted (24 pages). Available on ArXiv.
7. *Convex co-compact representations of 3-manifold groups.* ArXiv 2009.05191
   Joint with Andrew Zimmer.
   Submitted (40 pages). Available on ArXiv.

Other Writings

Preliminaries on dynamics on geometrically finite hyperbolic manifolds.
Oberwolfach Report No. 50/2021, pages 2732-2734.
Arbeitsgemeinschaft (Thin groups and Super-approximation), October 2021.

Projects in preparation

1. *Morse boundaries 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

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

Conference Talks

Mini-course (3-part, 4.5 hours) titled **"Actions of lattices on boundaries"**, Groups and Rigidity Around Zimmer Program (GRAZP Conference), Ventotene	Sept. 2023
Arbeitsgemeinschaft: Thin Groups and Super-strong Approximation, Oberwolfach	Oct. 2021
Nearly Carbon Neutral Geometric Topology Conference (NCNGT)	June 2020

Invited Seminar Talks

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
Lecture Series (3-part, 3 hours) on **"Convex Projective Structures"**, ISI Kolkata	Dec. 2022
Geometriy seminar, Florida State University	Nov. 2022

Geometric Analysis seminar, IIT Bombay, 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

Research Visits

Tata Institute of Fundamental Research (TIFR), Mumbai	March 2023
Institut de Recherche Mathematique de Rennes (IRMAR), Rennes	May 2022
Louisiana State Univeristy	March 2020
University of Texas - Austin	November 2019

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**:

Math 115 Differential Calculus	Fall 2019
Math 115 Differential Calculus	Fall 2018
Math 115 Differential Calculus	Winter 2018
Math 115 Differential Calculus	Fall 2017
Math 115 Differential Calculus	Winter 2017
Math 105 Pre-calculus	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 Poincareé 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