

Heidelberg University  
Mathematisches Institut  
Im Neuenheimer Feld 205  
Heidelberg 69120, Germany

Email: [mislam@mathi.uni-heidelberg.de](mailto:mislam@mathi.uni-heidelberg.de)  
[mitul.islam@gmail.com](mailto:mitul.islam@gmail.com)  
Website: <https://mitul-islam.github.io/>

## 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

Research Station Geometry and Dynamics  
Mentor: Beatrice Pozzetti

*Postdoctoral Researcher*  
(2021- Present)

### 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.Panser Gold Medal*

### Jadavpur University

Mathematics (Honours)

*B. Sc. (2011-2014)*  
*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](https://arxiv.org/abs/2104.05056)
2. *Convex co-compact representations of 3-manifold groups*  
Joint with Andrew Zimmer.  
Submitted. 40 pages. Available at: [arXiv:2009.05191](https://arxiv.org/abs/2009.05191)
3. *Rank-one Hilbert geometries.*  
Submitted. 34 pages. Available at: [arXiv:1912.13013](https://arxiv.org/abs/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](https://arxiv.org/abs/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](https://arxiv.org/abs/1907.03277)

#### AWARDS AND ACHIEVEMENTS

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<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

#### INVITED TALKS

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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 ( <i>cancelled</i> )	March 2020
Topology Seminar, University of Texas, Austin	November 2019
Indian Statistical institute, Kolkata, India	January 2019
Indian Statistical institute, Kolkata, India	July 2017

#### EXPOSITORY TALKS

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##### **Learning seminars, University of Michigan**

Introductory talk	February 2019
Geodesic flow is Anosov	February 2019

##### **Student seminars, University of Michigan**

Rank rigidity phenomena in geometry	January 2020
Random walks on word hyperbolic groups	November 2019
Quasimorphisms - Cohomological characterization of symmetric spaces	December 2018
Horocycle flow on hyperbolic surfaces	March 2018
Volume entropy	April 2017

#### TEACHING

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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

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**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

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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

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### 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

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*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*, Sète, 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