

Rupadarshi Ray

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Fifth year mathematics major
IISER Mohali

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Thesis

[Rigidity of locally symmetric spaces](#) Fall 2025-Spring 2026
Masters thesis under Dr. Arghya Mondal IISER Mohali

- ★ Mostow rigidity theorem for locally symmetric spaces of non-compact type
- ★ Boundary of CAT(0) symmetric spaces
- ★ Patterson-Sullivan measures

Academic interests

My primary interests lie in

- Differential geometry: Riemannian manifolds, symplectic manifolds and Lie groups
- Dynamics on manifolds: Hamiltonian flows, geodesic flows and ergodic theory
- Symmetric spaces of non-compact type, their boundaries and rigidity of locally symmetric spaces

I also am interested in the following areas

- Representation theory of Lie groups and Lie algebras
- Hyperbolic surfaces and Teichmüller theory
- Discrete subgroups of semi-simple Lie groups, arithmetic lattices
- Riemann surfaces and complex manifolds, their deformations and rigidity

Education

MS21, IISER Mohali 2021-
5 years BSMS Mohali, Punjab

- ★ current CPI: 8.42

Techno India Group Public School (TIGPS), Balurghat 2007-2020
Primary, Middle and High School Balurghat, West Bengal

- ★ Standard XII CBSE board exams: 93.6%
- ★ Standard X CBSE board exams: 90.6%

Talks

- 2025 **Reductive subgroups of $GL(n, \mathbb{R})$ and totally geodesic submanifolds of $P(n, \mathbb{R})$** , Boundary of symmetric spaces seminar, IISER Mohali, Fall 2025
- 2025 **Ergodic theorems for actions of locally compact groups**, Summer reading presentation, IISER Mohali, Summer 2025
- 2025 **Abel's theorem and Jacobi's inversion theorem**, Meromorphic functions on Riemann surfaces seminar, IISER Mohali, Summer 2025

2025 Symplectic manifolds and Hamiltonian flows

Introductory talk titled “When does a vector field kill area?” in the Graduate Students Seminar, IISER Mohali, Spring 2025

A talk with regards to the orbit method in representation theory, Summer 2025

2025 A talk on **construction of Haar measure on locally compact Hausdorff groups** for the course on Fourier analysis, IISER Mohali, Semester 8

2025 A short talk on **construction of Riemann surface of holomorphic functions** for the course on seminar delivery, IISER Mohali, Semester 8

2025 A talk on **periods of elliptic curves** for the course on Arithmetic of elliptic curves, IISER Mohali, Semester 8

2024 A talk on **knower’s and liar’s paradoxes and their formalizations** titled “What does a knower and a liar have in common?”, course on Philosophy of language, IISER Mohali, Semester 7

2024 A short talk on **topological conjugacy of linear flows** for the course on seminar delivery, IISER Mohali, Semester 7

2024 A talk on **some comparison theorems in Riemannian geometry** for the course on Riemannian geometry, IISER Mohali, Semester 7

Background and involvement

Sheaf theoretic proof of de Rham isomorphism Summer 2023
Summer reading under Dr. Shane D’ Mello IISER Mohali

- ★ Lee on de Rham cohomology of differential forms
- ★ Griffiths and Harris on sheaf cohomology of differential forms
- ★ Bott and Tu on Cech-de Rham double complex

Representation theory of groups and Lie algebras Winter 2023 - Summer 2024
Reading under Dr. Vaibhav Vaish IISER Mohali

- ★ Fulton and Harris on representation theory of finite groups and Lie algebras
- ★ Voigt on quantum mechanics and representation theory

Knots and braids Semester 6
Mathematics course instructed by Dr. Shane D’ Mello IISER Mohali

- ★ Jones polynomial of knots and links
- ★ Universal Abelian cover of knot complements and Alexander polynomial

Riemannian geometry Semester 7
Mathematics course instructed by Dr. Soma Maity IISER Mohali

Arithmetic of elliptic curves Semester 8
Mathematics course instructed by Dr. Abhik Ganguli IISER Mohali

Geometric Aspect of Algebraic Varieties Spring 2025
Conference and celebration of mathematical legacy of Dr. Kapil Hari Paranjape IISER Mohali

Meromorphic functions on Riemann surfaces Summer 2025
Seminar organized by self IISER Mohali

- ★ Talk by Dr. Kapil Hari Paranjape on etale space of sheaf of holomorphic and meromorphic functions, ringed space definition of Riemann surfaces

- ★ Student talks on constructing meromorphic functions on Riemann surfaces, Riemann-Roch theorem, Abel's theorem and Jacobi's inversion theorem

[Rigidity of Discrete Groups](#) June 30 - July 4, 2025
Workshop organized by Dr. Krishnendu Gongopadhyay and Dr. Pranab Sardar IISER Mohali

- ★ Attended talks by Dr. Marc Bourdon, Dr. C S Rajan
- ★ Attended talks on the Mostow rigidity theorem for hyperbolic 3-manifolds by Dr. Arghya Mondal

Ergodic theorems for actions of locally compact groups Summer 2025
Summer reading under Dr. Jotsaroop Kaur IISER Mohali

- ★ Following Einsiedler and Ward, I presented proofs of ergodic theorems for measure preserving transformations and actions of Amenable groups with tripling property

[Singapore-Bangalore “What is ...?” Workshop on Mathematics](#) Fall 2025
Workshop organized by NUS Singapore and IISc Bangalore IISc Bangalore

Boundary of symmetric spaces Fall 2025
Seminar organized by Dr. Arghya Mondal IISER Mohali

- ★ Symmetric spaces of non-compact type, $P(n, \mathbb{R})$ and its totally geodesic submanifolds
- ★ Boundary of CAT(0) symmetric spaces

Misellaneous

- 2025 Volunteered to give a talk on [Fourier series](#) in a [Science festival 2025 in IISER Mohali](#)
- 2023 Volunteered in official help sessions on linear algebra for first year students in IISER Mohali in Monsoon 2023
- 2023 [Wrote a route-map for introductory resources for mathematics and physics.](#)
- 2019 **Electronics project in Standard XII:** Implementation of $A \cdot B + C$ using resistance-transistor logic