Theoretical Statistics and Mathematics Unit

Indian Statistical Institute

203 B.T. Road, Kolkata - 700108

Pre-Thesis Submission Seminar

Date: August 19, 2026
Time: 4:00 PM

VENUE:

L-Infinity, 5th Floor, A.N. Kolmogorov Bhavan, ISI Kolkata

SPEAKER:

Arkajit Pal Choudhury

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TITLE:

Maximal Gromov hyperbolic Spaces and their boundaries: Polyhedral structures and Gromov-Hausdorff convergence

ABSTRACT:

It is well-known that an isometry between real hyperbolic spaces extends naturally to a Möbius homeomorphism - i.e. cross-ratio preserving homeomorphism - between their Gromov (or visual) boundaries. The same phenomenon holds for any boundary continuous Gromov hyperbolic space. The natural question then arises:
Does a Möbius homeomorphism between the Gromov boundaries extends to isometry of the underlying spaces?
This is the Möbius rigidity problem, related to other problems such as the marked length spectrum rigidity and geodesic conjugacy problem for negatively curved manifolds. Möbius rigidity is known to hold for real hyperbolic spaces, and plays a role in several rigidity results, such us Mostow rigidity.

For "good" (i.e. proper, geodesically complete) Gromov hyperbolic spaces the Gromov boundary is a special type of compact metrisable space called quasi-metric antipodal space. In a paper published in 2024, Biswas gave a positive answer to the Möbius rigidity problem for a distinguished sub-class of good Gromov hyperbolic spaces called 'maximal Gromov hyperbolic spaces' (in short MGHS). These Gromov hyperbolic spaces are 'maximal' in the sense, any other good Gromov hyperbolic space with the same Gromov boundary isometrically embeds into them, i.e. it is the maximal hyperbolic filling. Biswas showed that given any quasi-metric antipodal space one can naturally construct the MGHS, hence established an equivalence of categories between the quasi-metric antipodal spaces and maximal Gromov hyperbolic spaces.

MGHS exhibit rich geometric structures. In this talk, we demonstrate that MGHS with finite boundary admit a polyhedral complex structure. We will also discuss several Gromov–Hausdorff convergence results for these spaces and their boundaries, along with some applications of these results. As a byproduct, we obtain a convergence theorem for CAT(-1) spaces. We shall also discuss the deformation space of the polyhedral structures of MGHS with finite boundary of a fixed cardinality, and present a natural stratification of this deformation space.

This talk is based on joint work with Prof. Kingshook Biswas and an ongoing work which are part of speaker's thesis.

ALL ARE CORDIALLY INVITED

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