Department of Mathematics
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INVITED TALK

by

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After completing his MSc from the Indian Institute of Technology Bombay, Dr. Tejas Kalelkar received his PhD from the Indian Statistical Institute, Bangalore. His topic of research was low-dimensional topology. He was then a postdoctoral fellow at the Institute of Mathematical Sciences, Chennai and a Chauvenet Postdoctoral Fellow at the Washington University in St Louis for three years. He joined IISER Pune in 2013.

Lecture 1: Introduction to Knot Theory

The different ways that a string can be knotted has been an important area of study, both from applied and theoretical points of view. The mathematics tools that are used to study knots begin with simple combinatorial ideas and progress to deep mathematical theories. In this talk we will introduce knot theory and talk about some of its basic invariants. There are no prerequisites for this talk and it should be accessible to everyone.

January 23, 2026 **Auditorium, Satyakam Bhawan** **10:30 am**

Lecture 2: Algorithms to Recognise Knots

A central question in knot theory is to recognise knots from their diagrams. I will begin with a survey of algorithms for knot recognition and then focus on a specific algorithm for hyperbolic knots which uses Pachner moves. A Pachner move is a local combinatorial change to the triangulation of a manifold. Any two geometric ideal triangulations of a cusped complete hyperbolic 3-manifold are related by a sequence of Pachner moves through topological triangulations. We give a bound on the length of this sequence in terms of a lower bound on the dihedral angles of the geometric triangulations. This leads to an effective algorithm to check the equivalence of geometrically triangulated hyperbolic manifolds and therefore of hyperbolic knots. This is joint work with Sriram Raghunath.

January 23, 2026 **Room 5, Satyakam Bhawan** **02:30 pm**

Tarun Kumar Das
Head