

# Ashok Maitra Memorial Lectures 2024-25

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## **COLLOQUIUM**

January 09, 2025 (THURSDAY)

**Time:** 4.30 PM

**Venue:** L-Infinity Seminar Room, A. N. Kolmogorov Bhavan

## **Functional Inequalities in Random Permutation Dynamics: Spectral Gaps and Entropy Factorizations**

We explore functional inequalities associated with random permutation dynamics, such as random transpositions and other card shuffling algorithms. Beginning with the spectral gap of the interchange process on arbitrary weighted graphs and its generalization to hypergraphs, we then address their entropic counterparts. These entropic inequalities lead naturally to entropy factorization estimates, which have significant applications, including resolving a longstanding conjecture on the upper bound of the permanent of arbitrary matrices with nonnegative entries. Along the way, we highlight recent advancements and outline some open questions.