



Theoretical Statistics and Mathematics Unit

Indian Statistical Institute

203 B.T. Road, Kolkata-700108

MONDAY COLLOQUIUM

Date: July 20, 2026

Time: 04:15 P.M.

Venue: L-infinity, Stat-Math Unit (5th Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

Satyaki Mukherjee

National University of Singapore

TITLE:

Stability, Fluctuations, and Non-Chaos in Gaussian Mixture NPMLEs

ABSTRACT:

This talk introduces the Gaussian mixture Non Parametric Likelihood Estimation (NPMLE) problem from first principles and explains why it is natural to view it as a random optimization problem. Recent results show that the NPMLE landscape is stable: approximate maximizers remain close to the truth in Hellinger and Kullback–Leibler loss, with guarantees that tolerate finite-time optimization error. The talk also discusses fluctuation results for the optimized likelihood, their consequences for differential entropy estimation, and a non-chaos result showing that small perturbations of the data do not produce macroscopically different fitted densities. The final part interprets these results through a statistical-mechanics lens, connecting likelihood landscapes to ideas such as ground states, free energy, asymptotic essential uniqueness, superconcentration, and chaos. This perspective suggests a useful common language for robustness, fluctuations, and stability in non-parametric likelihood problems.

ALL ARE CORDIALLY INVITED

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