



# INDIAN STATISTICAL INSTITUTE

Theoretical Statistics and Mathematics Unit, Kolkata

## LECTURE

Date: June 19, 2023, Monday  
Time: 04:15 PM

### VENUE:

**L-infinity**

(5<sup>th</sup> Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

### TITLE:

**Parameter Estimation in p-Spin Ising Models**

### SPEAKER:

**Somabha Mukherjee**

Department of Statistics and Data Science  
National University of Singapore

### ABSTRACT:

*The Ising model is a statistical framework for modelling network-dependent binary data that arise in all avenues of science, technology and society, such as epidemic networks, facebook friendship networks, election data and spatial statistics. However, in most practical scenarios, peer-group effect is observed, i.e. interactions occur not just in pairs, but in higher order tuples. This phenomenon is captured by the so-called Tensor Ising Models. In this talk, I will discuss about estimation of the natural parameters in tensor Ising models, mainly focusing on their asymptotic properties. The asymptotics are highly non-standard, characterized by the presence of a critical curve in the interior of the parameter space on which the estimates have a limiting mixture distribution, and a surprising superefficiency phenomenon occurs at the boundary points of this critical curve. I will also briefly compare the performance of the two central estimators considered in the talk based on the notion of Bahadur efficiency. Finally, I will draw a connection of this model with the vanilla logistic regression in classical statistics, but with high-dimensional covariates and network-dependent responses.*

**ALL ARE CORDIALLY INVITED**