



**Theoretical Statistics and Mathematics Unit, Kolkata**  
**INDIAN STATISTICAL INSTITUTE**

**Thesis Defence Seminar**

**Date: July 24, 2025**

**Time: 02:30 PM**

**VENUE:**

**L- Infinity**

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

**TITLE:**

**Some Nonparametric Tests for High-Dimensional and  
Functional Data**

**SPEAKER:**

**Bilol Banerjee**

Stat-Math Unit, ISI Kolkata

**ABSTRACT:**

*The advancement of information technology and sciences over the last few decades has facilitated the collection, storage and analysis of huge data sets. Many of these data sets contain observations having large number of features, and in some cases, this number is comparable to or even much larger than the sample size. Many traditional statistical methods cannot be meaningfully used in such situations. We develop some inferential tools for such high dimensional data. In particular, we consider the two-sample problem and the problem of testing spherical symmetry of a multivariate distributions. We construct some nonparametric tests in these contexts and investigate the limiting behavior of the proposed tests when the dimension diverges to infinity while the sample size may or may not grow with the dimension. Several simulated and real datasets are analyzed to compare their empirical performance with some state-of-the-art methods.*

*In practice, we also encounter situations, where the feature are not scalar or finite-dimensional vectors, but they are functions or curves. We also focus on such functional data sets. We develop a two-sample test for functional data and construct a test for mutual independence among several random functions. Theoretical properties of our proposed tests are investigated under appropriate regularity conditions, and their empirical performance is evaluated by analyzing several simulated and real data sets against some state-of-the-art methods.*

**ALL ARE CORDIALLY INVITED**