



**INDIAN STATISTICAL INSTITUTE**  
Theoretical Statistics and Mathematics Unit  
Kolkata 700108

## **SEMINAR**

Date: **30<sup>th</sup> May 2023, Tuesday**

Time: **04:15 P.M**

Venue: **L-Infinity**

5<sup>th</sup> Floor, A N Kolmogorov Bhavan,  
Theoretical Statistics and Mathematics Unit  
Indian Statistical Institute, Kolkata 700108

### TITLE

**Geometry of the trace of random walk on torus and random interlacements**

**SPEAKER:**

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Tata Institute of Fundamental Research, Mumbai

**ABSTRACT:**

The random interlacements on the hypercubic lattice in dimensions 3 and higher (or any transient graph for that matter) describe the trace of a Poisson ensemble of bi-infinite random walk trajectories indexed by a time-like intensity parameter. The model was introduced in a seminal paper by Sznitman as a local limit of the trace of simple random walk on the (discrete) torus when it runs for an amount of time proportional to volume of the torus. This immediately gives rise to an intriguing percolation problem where one is interested in the percolative properties of the vacant set or equivalently the question of disconnection from the boundary by random walk trajectories. Often referred to as the fragmentation of a torus by random walk, this is a prototypical example of a percolation model showing non-local dependence and one which is much more "rigid" in several aspects compared to the Bernoulli percolation, the random-cluster models and even the closely related level-sets of Gaussian free field.

In this talk we will review some exciting, very recent developments on the anatomy of the clusters of the vacant set of random interlacements and random walks. These involve ideas ranging from the potential theory of random walks to some very recent advances in Percolation theory. Based on several (upcoming) joint works with Hugo Dumini-Copin, Pierre-Francois Rodriguez, Franco Severo, Augusto Teixeira and Yuriy Shulzhenko.

**ALL ARE CORDIALLY INVITED**