Jyotiprasad Medhi Memorial Annual Lecture

Department of Mathematics

IIT Guwahati
August 16, 2017

Title: Coverage of Space by Random Sets

Speaker: Prof. Rahul Roy, Indian Statistical Institute, Delhi.

Venue: Lecture Hall 1, IIT Guwahati

Time: 4:15 PM, August 16, 2017

ABSTRACT

A vertex $\mathbf{i} \in \mathbb{N}^d$ is declared open with probability $0 < p < 1$, independently of other vertices. At each open vertex, we place the bottom-left corner of a random cube whose lengths are independently and identically distributed. We study the behaviour of the randomly generated set C formed by the union of these cubes. The space $\mathbb{N}^d$ is said to be *eventually covered* if there exists $\mathbf{t} \in \mathbb{N}^d$ such that $\mathbf{t} + \mathbb{N}^d \subseteq C$; and this coverage is 'reinforced' if there exists $\mathbf{s} \in \mathbb{N}^d$ such that for each vertex $\mathbf{z} \in \mathbf{s} + \mathbb{N}^d$ there are at least two distinct cubes covering it. We obtain a phase transition depending on the dimension as well as depending on the distribution of the length of the cube.