NYU-ECNU
Institute of Mathematical Sciences
at NYU Shanghai

PROBABILITY SEMINAR

TOPIC: **Scaling Limits of Random Graphs and Minimum Spanning Trees in A Mean Field Setting**

SPEAKER: **Nicolas Broutin, Visiting Assistant Professor of Mathematics and Computer Science at NYU Shanghai**

TIME: 3:00-4:00 pm, 11 December 2014

VENUE: Room 209, Pudong campus, 1555 Century Avenue (世纪大道 1555 号，浦东校区，209 室)

ABSTRACT OF THE TALK

It is widely believed that physical systems exhibit a certain remarkable “critical” behavior at the very point of phase transition. One of the main aspects is that the “objects'” involved should lack a typical scale, and become fractal. Making these observations rigorous is notoriously difficult in a geometric setting. One way to progress is to first focus on what one can obtain in the absence of ambient geometry to make the combinatorics more tractable.

I will discuss a few problems related to scaling limits of the classical random graphs, where there are n labelled vertices, and each edge is present with probability p independently of the others. The “objects” we consider are not scalar observables but the graphs themselves, seen as metric spaces when endowed with the graph distance. Then, the kind of scaling limit we are after are random metric spaces that describe the large-size behavior these graphs.

I will show that when the average degree is close to one, the random graph looks like a collection of random compact continuous metric spaces that are fractal and that may be constructed from Brownian motion and Poison point processes. These limit metric spaces also make it possible to describe a similar scaling limit for the minimum spanning tree of a complete graph weighted with independent uniform weights.

My main focus will be on the description of the concepts and on the intuition underlying the construction of these scaling limits.

BIOGRAPHY

Nicolas Broutin is visiting assistant professor of mathematics and computer science at NYU Shanghai. He is also a research scientist at Inria Paris-Rocquencourt. He holds a MEng from Ecole Polytechnique, a PhD from McGill University and an Habilitation from UPMC Paris 6.