

# Séminaire de Probabilités et Statistiques

Mardi 11 avril à 14h00

Laboratoire Dieudonné

Salle de Conférences

**Bruce Reed**

(McGill Univ.)

*Random Models Of 21st Century Networks And Their  
Connectivity Structure*

The traditional Erdős-Rényi model of a random network is of little use in modeling the type of complex networks which modern researchers study. It postulates that each node has the same likelihood of being attached to every other node. However, in, e.g. the web, certain authoritative pages will have many more links entering them. A 1995 paper of Molloy and myself, cited over 1500 times, sets out some conditions guaranteeing the existence of a giant component in a graph with a specified degree sequence. This work has attracted such a great deal of attention because it can be applied to random models of a wide range of complicated 21st century networks such as the web or biological networks operating at a sub-molecular level. A heuristic argument suggests that a giant component will exist provided the sum of the squares of the degrees of the vertices of the network is at least twice the sum of the degrees. Molloy and myself proved that this is indeed true subject to certain technical conditions.

Recently, together with Joos, Perarnau-Llobet and Rautenbach we showed the result under essentially no conditions. I will present, in an accessible way, a variety of complex networks and will then sketch briefly the proof of our result and how it differs from the proof of the Molloy-Reed result.