Stanford University  
Departments of Mathematics and Statistics  

PROBABILITY SEMINAR  

4:15pm, Monday, January 6, 2014  
Sequoia Hall Room 200  
Cookies served at 3:45pm, 1st floor Lounge.

Speaker: Sanchayan Sen, Courant Institute  

Title: The structure of critical inhomogeneous random graphs  

Abstract: Since the work of Bollobas, Janson and Riordan (2007, Random Struct. Alg.), there has been increasing interest in the study of inhomogeneous random graphs. Consider the random graph on $n$ vertices constructed from i.i.d. positive random variables $w_1, \ldots, w_n$ by placing an edge between vertex $i$ and vertex $j$ with probability $\left(1 - \exp\left(-w_iw_j/\sum W_{k=1}^n\right)\right)$ independently for each $i \neq j$. This model corresponds to the rank-1 case of general inhomogeneous random graphs. The random graph is critical if $E(w_1) = E(w_1^2)$. The study of the critical behavior for this model was initiated by van der Hofstad (2012, Random Struct. Alg.).

In the present work, we show that after assigning mass $w_i/n^{2/3}$ to vertex $i$ and scaling the graph distance by $n^{1/3}$, the components of this graph (at criticality) viewed as measured metric spaces converge in Gromov–Hausdorff–Prokhorov topology to some limiting (random) compact, measured metric spaces if $w_1$ satisfies appropriate conditions. This result also addresses the question of universality of the continuum limit of the components (viewed as measured metric spaces) of critical Erdös–Renyi random graphs.

This is joint work with Shankar Bhamidi, Amarjit Budhiraja and Xuan Wang.