

THE MATHEMATICS DEPARTMENT PRESENTS

A MATHEMATICS COLLOQUIUM

THURSDAY, February 15, 2007

BOND HALL 106

4:00 pm

Title: Random Geometric Graphs

Speaker: Amites Sarkar, University of Memphis

Abstract: Recently there has been much interest in models of random geometric graphs, which arise naturally in communication networks and have also been used to study clustering of data. In one such model, we let \mathcal{P} be a Poisson process of intensity one in a square S_n of area n , and join each point of \mathcal{P} to its k nearest neighbours to obtain the random geometric graph $G(S_n, k)$. How large should k be to make $G(S_n, k)$ connected? I'll give upper and lower bounds for this problem. Specifically, let $p(n, k)$ be the probability that $G(S_n, k)$ is connected. I'll show that for $k < 0.3043 \log n$, $p(n, k) \rightarrow 0$ as $n \rightarrow \infty$, and that if $k > 0.5139 \log n$, $p(n, k) \rightarrow 1$ as $n \rightarrow \infty$. I also hope to discuss some of our recent work establishing the existence of a critical constant c such that $G(S_n, \lfloor c' \log n \rfloor)$ is (with probability tending to one) disconnected if $c' < c$ and connected if $c' > c$. There still remain several extremely natural open questions that we would very much like to see answered. I'll formulate these questions precisely and give an account of some recent progress on them. This is joint work with Paul Balister, Béla Bollobás and Mark Walters.

Refreshments will precede the talk at 3:30pm in Bond Hall 300
courtesy of David Hartenstine.