

THE MATHEMATICS DEPARTMENT PRESENTS

# A MATHEMATICS COLLOQUIUM

THURSDAY, February 19, 2009

BOND HALL 217

4:00 pm

**Title: Partitioning random geometric covers**

**Speaker: Amites Sarkar**, Western Washington University

**Abstract:** I'll present some new results on partitioning both random and non-random geometric covers. For the random results, let  $\mathcal{P}$  be a Poisson process of intensity one in the infinite plane  $\mathbf{R}^2$ , and surround each point  $x$  of  $\mathcal{P}$  by the open disc of radius  $r$  centred at  $x$ . Now let  $S_n$  be a fixed disc of area  $n \gg r^2$ , and let  $C_r(n)$  be the set of discs which intersect  $S_n$ . Write  $E_r^k$  for the event that  $C_r(n)$  is a  $k$ -cover of  $S_n$ , and  $F_r^k$  for the event that  $C_r(n)$  may be partitioned into  $k$  disjoint single covers of  $S_n$ . I'll sketch a proof of the inequality  $\mathbf{P}(E_r^k \setminus F_r^k) \leq \frac{c_k}{\log n}$ , which is best possible up to a constant. The non-random result is a classification theorem for covers of  $\mathbf{R}^2$  with half-planes that cannot be partitioned into two single covers. It was motivated by a desire to understand the obstructions to  $k$ -partitionability in the original random context.

This is all joint work with Paul Balister, Béla Bollobás and Mark Walters.

Refreshments will precede the talk at 3:30pm in Bond Hall 300.