Geometry Seminar
Tuesday, Dec 15, 2009
Room 202 WWH at 6:00 P.M.

Generalized Ham-Sandwich Cuts

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Bárány, Hubard, and Jerónimo recently showed that for given well separated convex bodies $S_1, \ldots, S_d$ in R^d and constants $\beta_i \in [0, 1]$, there exists a unique hyperplane h for which $Vol(h^+ \cap S_i) = \beta_i Vol(S_i)$; h^+ is the closed positive transversal halfspace of h.

I will describe a discrete analogue for a set S of n points in R^d that is partitioned into a family $S = P_1 \cup \cdots \cup P_d$ of *well separated* sets and which are in *weak general* position. The combinatorial proof inspires an $O(n(\log n)^{d-3})$ algorithm which, given positive integers $a_i \leq |P_i|$, finds the unique hyperplane h incident with a point in each P_i and having $|h^+ \cap P_i|$ $= a_i$. The proof for the discrete version leads to a simpler proof of the original result as well as to a strengthening of that theorem. (joint work with Jihui Zhao)

For more information please visit the seminar website at:
`http://www.math.nyu.edu/seminars/geometry_seminar.html`.