

# MATHEMATICS COLLOQUIUM

## *Geometry of Fractional Brownian Sheets*

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As a class of typical anisotropic Gaussian random fields, fractional Brownian sheets arise naturally in many areas, including in stochastic partial differential equations and in studies of the symmetric Markov processes. Let  $B^H = \{B^H(t), t \in \mathbb{R}_+^N\}$  be an  $(N, d)$ -fractional Brownian sheet with Hurst index  $H = (H_1, \dots, H_N) \in (0, 1)^N$ . We prove that  $B^H$  has the property of *sectorial local non-determinism*. By using it as a main tool, we describe various sample path properties of  $B^H$  in terms of the Hurst index  $H$ . In particular, we determine the Hausdorff dimension of the image set  $B^H(E)$  for an arbitrary Borel set  $E \subset (0, \infty)^N$ , and we provide sufficient conditions for  $B^H(E)$  to be a Salem set or to have interior points almost surely.

If time permits, we will investigate the existence and joint continuity of the local times and self-intersection local times of fractional Brownian sheets and determine the Hausdorff dimensions of the sets of  $m$ -multiple times and  $m$ -multiple points.

Date: Monday, February 13, 2006  
Time: 3:00pm-4:00pm  
Place: J. Wiener Lecture Hall, MAGC 1.302

Refreshments will be served at 2:50pm.

For further information or for special accommodations, contact Dr. Karen Yagdjian at 381-2145, via email at [yagdjian@utpa.edu](mailto:yagdjian@utpa.edu), or visit [www.math.panam.edu/colloquia.html](http://www.math.panam.edu/colloquia.html)