1053-42-170 **Izabella Laba** and **Malabika Pramanik*** (malabika@math.ubc.ca), 1984 Mathematics Road, Department of Mathematics, University of British Columbia, Vancouver, BC V5B 2E7, Canada.

Maximal operators and differentiation theorems on sparse sets.

In this work joint with Izabella Laba, we study maximal averages associated with singular measures on $\mathbb{R}$. Our main result is a probabilistic construction of singular Cantor-type measures supported on sets of Hausdorff dimension $1-\epsilon$, $0 \leq \epsilon < \frac{1}{3}$ for which the corresponding maximal operators are bounded on $L^p(\mathbb{R})$ for $p > (1+\epsilon)/(1-\epsilon)$. As a consequence, we are able to answer a question of Aversa and Preiss on density and differentiation theorems in one dimension. (Received September 01, 2009)