1068-28-303   **Michael T. Lacey** (`Lacey@math.gatech.edu`), School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332, **Eric T. Sawyer** (`sawyer@mcmaster.ca`), Department of Mathematics and Statistics, McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4K1, Canada, **Xavier Tolsa** (`xtolsa@mat.uab.cat`), Departament de Matematiques, Universitat Autonoma de Barcelona, 08193 Bellaterra, Spain, and **Ignacio Uriarte-Tuero*** (`ignacio@math.msu.edu`), Department of Mathematics, Michigan State University, East Lansing, MI 48824. *Fractals yielding extremal examples in some problems in harmonic and complex analysis.*

I will report on some Cantor type sets that have provided extremal examples in problems related to quasiconformal maps and harmonic analysis.

More precisely, Astala et al. [Duke, 2008] asked whether BMO and L^∞ removability were the same problem for planar K-quasiregular maps. A non-self-similar Cantor set provided a negative answer [UT, IMRN 2008]. The same example further proved the sharpness of a conjecture of Astala from 1994 (later proved by Lacey, Sawyer, and UT [Acta, 2010]).

The same type of example further proved the sharpness of a metric condition for removability for bounded K-quasiregular maps [Tolsa, UT].

A related problem (though at first sight very different) pertains to characterizing pairs of weights (u, v) for which the Hilbert transform is bounded $L^2(u) \to L^2(v)$. A conjecture was made in a seminal paper by Nazarov, Treil and Volberg that a certain pivotal condition was necessary. Such conjecture was disproved by Lacey, Sawyer and UT using a Cantor set example.

The talk will be self-contained. (Received January 19, 2011)