1122-58-200 **Michel L. Lapidus*** (lapidus@math.ucr.edu), University of California, Department of Mathematics, 900 University Avenue, Riverside, CA 92521-0135. *Noncommutative Fractal Geometry and Analysis on Fractal Manifolds: A Tale of Metrics, Hausdorff Measures and Geodesics.*

We discuss aspects of geometric analysis on fractals and noncommutative fractal geometry (NCG). We construct spectral triples and Dirac operators on a class of fractals built on curves, including the Sierpinski gasket (SG), the harmonic gasket (HG, which is ideally suited for developing analysis on fractals and is a good model for the elusive notion of a 'fractal manifold'), as well as suitable quantum graphs. We recover from the spectral triple the geodesic metric intrinsic to the fractal. This work is joint with Jonathan Sarhad (Journal of Noncommutative Geometry, vol. 8, 2014). It significantly extends earlier work of the author, joint with Eric Christensen and Cristina Ivan (Advances in Math., vol. 217, 2008) in which we constructed geometric Dirac operators allowing us to recover the natural geodesic metric and the natural Hausdorff measure of the Euclidean SG (as well of other fractals built on curves, but not HG). It also builds on earlier work of the author (carried out in the 1990s) in which, in particular, a broad research program was proposed for developing NCG. The new results highlighted enable us to get one step closer to developing aspects of geometric analysis truly connected with the study of fractal manifolds and their intrinsic families of geodesic curves. (Received August 13, 2016)