1118-58-179 **Daniel J Kelleher*** (dkellehe@purdue.edu), Department of Mathematics, West Lafayette, IN 47907, and **Fabrice Baudoin**. *Bakry-Emery gradient estimates for metric measure spaces and Poincare Duality on fractals.*

There has been much work in establishing the relationship between Bakry-Emery gradient inequalities and other functional inequalities, similar to that of curvature dimension inequalities. This work establishes that on doubling metric measure Dirichlet spaces with suitable conditions, that the Bakry-Emery inequality implies bounds on Reisz Transforms, an isoperimetric inequality, Wasserstein Control and a Log-Sobolev inequality. The gradient estimate is proven on the Sierpinski Gasket with harmonic energy measures as well for some metric graphs. These are spaces on which other notions of curvature have been elusive. To obtain these results, the space of differential forms on these spaces is classified using a measurable analogue of Poincare duality for classical differential forms. (Received January 31, 2016)