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Alessio Figalli*, Department of Mathematics, The University of Texas at Austin, 1 University Station, C1200, Austin, TX 78712. *Regularity of optimal transport maps and applications to the geometry of the cut locus.*

In this talk I will describe some recent developments on the regularity theory for optimal transport maps on a Riemannian manifold, when the cost function is given by the squared distance. We will also see that the regularity theory of optimal maps allows to study the geometry of the cut locus of the manifold. In particular we can prove that if (M, g) is a C^4 -perturbation of the standard round sphere, then all its tangent cut loci are uniformly convex (joint work with Ludovic Rifford and Cédric Villani). (Received August 04, 2009)