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Fabrice Baudoin and **Nicola Garofalo*** (garofalo@math.purdue.edu), Department of Mathematics, 150 N. University Street, West Lafayette, IN 47907-2067. *Generalized Bochner formulas and Ricci lower bounds for sub-Riemannian manifolds of rank two.*

This talk describes recent joint work with Fabrice Baudoin. We introduce a new class of sub-Riemannian manifolds of rank two which encompasses Riemannian manifolds, CR manifolds with vanishing Webster-Tanaka torsion, orthonormal bundles over Riemannian manifolds, and graded nilpotent Lie groups of step two. These manifolds admit a canonical horizontal connection and a canonical sub-Laplacian. We construct on these manifolds an analogue of the Riemannian Ricci tensor and prove Bochner type formulas for the sub-Laplacian. As a consequence, it is possible to formulate on these spaces a sub-Riemannian analogue of the so-called curvature dimension inequality. Sub-Riemannian manifolds for which this inequality is satisfied are shown to share many properties in common with Riemannian manifolds whose Ricci curvature is bounded from below. (Received August 21, 2009)