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In this poster, we will present how the general framework of noncommutative geometry can be used for the discretization of differential operators. We present the exterior derivative as a commutator with a hermitian operator; the so-called Dirac operator. We show that finite difference expressions can be recovered as convex combinations of eigenvalues of this commutator. In addition, we show that under suitable conditions i.e. when the coefficients of the Dirac operator are determined by a suitable distribution, the Laplace operator on a smooth manifold is recovered at the limit.

Joint work with Jean-Christophe Nave (McGill University, Canada).