# Higher Symmetries of Laplace and Dirac operators - towards supersymmetries

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In this talk, I will survey some of the results obtained in [3, 4, 5]. On a flat (pseudo-)Riemannian manifold, the higher symmetries of the Laplacian form an associative algebra of differential operators, determined by Eastwood in [1]. It plays a central role in higher spin field theory and give a geometric realization of a highly non-trivial object from Lie theory: the Joseph ideal [2]. Using quantization methods, I propose a simple proof of Eastwood's result and extend it to the system Laplace $\oplus$ Dirac operators. In dimension 4, its higher symmetries are generated by the conformal supersymmetries discovered by Wess and Zumino [6].

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