

# Representation Theory, Geometry & Combinatorics Seminar

Organizer(s): M. Haiman, K. Reshetikhin, D. Hill & J. Sussan

Monday, 1:00–3:00pm, 939 Evans

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9/29/08    **Reimundo Heluani**, UCB

*Generalized Complex Geometry and Conformal Supersymmetry*

Given a compact finite dimensional Lie Group  $G$  with Lie algebra  $\mathfrak{g}$ , we can construct the Laplacian of  $G$  in terms of the Casimir of  $\mathfrak{g}$ . An infinite dimensional analog is provided by the Sugawara construction: the Virasoro Lie algebra (a central extension of the Lie algebra of holomorphic vector fields on the punctured disk) embeds in certain completion of the universal enveloping algebra of  $\hat{\mathfrak{g}}$  (the corresponding affine Kac-Moody Lie algebra). A super extension of this result is known as the Kac-Todorov construction, whose finite dimensional counterpart involves the *cubic Dirac operator* of  $G$ .

In this talk we will show how a suitable version of the Kac-Todorov construction works not only for a finite dimensional Lie algebra  $\mathfrak{g}$  with invariant form  $(,)$  but for "families of them", namely for *Courant Algebroids*. This allows us to construct hidden supersymmetries of the Chiral de Rham complex of generalized complex manifolds. Surprisingly (or not) we find expressions like the cubic Dirac operator as the generator of these supersymmetries.