September 30, 2015: David Vogan (MIT), "Dirac index and associated varieties."

In the early 1970s, work of Parthasarathy, Hotta, and Atiyah-Schmid led to a realization of each of Harish-Chandra's discrete series representations for a real reductive group G as the index of a Dirac operator on the Riemannian symmetric space G/K. Parthasarathy showed how to make this calculation one representation at a time: to define an algebraic "Dirac index" of each irreducible representation, which computes the multiplicity of that irreducible in the geometric Dirac index.

Recently Salah Mehdi and Pavle Pandžić formulated a conjecture relating the Dirac index of an irreducible representation to its associated variety: the nilpotent coadjoint orbit that "best approximates" the representation. I will explain a proof of this conjecture (joint with Roger Zierau). This is part of a (still far from complete) program to understand every kind of "index" for representations in terms of restriction to a maximal compact subgroup.