Nelia Charalambous, University of Cyprus, Cyprus.

Title: The spectrum of the Laplacian on functions and differential forms.

Abstract: The essential spectrum of the Laplacian on functions over a noncompact Riemannian manifold has been extensively studied. It is known that on hyperbolic space a spectral gap appears, whereas is has been conjectured that on manifolds with uniformly subexponential volume growth and Ricci curvature bounded below the essential spectrum is the nonnegative real line. Much less is known for the spectrum of the Laplacian on differential forms. In our work we prove a generalization of Weyl's criterion for the essential spectrum of a self-adjoint and nonnegative operator on a Hilbert space. We then apply this criterion to expand the set of manifolds on which the spectrum of the Laplacian on functions is the nonnegative real line. We also use it to study the spectrum of the Laplacian on k-forms over an open manifold. We first show that the spectrum of the Laplacian on 1-forms always contains the spectrum of the Laplacian on functions. Moreover, we can apply our criterion to study the spectrum of the Laplacian on k-forms under a continuous deformation of the metric. The results that we obtain allow us to study the spectrum of the Laplacian on k-forms over asymptotically flat manifolds. This is joint work with Zhiqin Lu.