## Colloquíum



## Speaker: Patrick Eberlein University of North Carolina, Chapel Hill

Wednesday, October 30, 2013 4:00 pm Room: 117 Hayes-Healy Hall

Title: Growth estimates for orbits of self adjoint, noncompact, semisimple groups

## Abstract:

Let V be a finite dimensional real vector space, and let G denote a connected, noncompact, semisimple subgroup of GL(V). Let g be an inner product on V such that G is self adjoint, and let || denote the norm on V defined by g. Let d denote the right invariant Riemannian metric on G determined by g at the identity of G. Fix v in V. Let H denote the subgroup of G that fixes v. For vectors v not in a proper G-invariant subspace W of V the orbit G(v) is noncompact. For v in V - W we define algebraic upper and lower bounds U(v) and L(v) for the growth of  $\log \frac{|g(v)|}{d(g,H)}$  as d(g,H) goes to infinity, and we determine these bounds for the irreducible representations of G = SL(2, R). For some of these representations L(v) = U(v) for v in a subset O of V that is open in the vector space (but not Zariski) topology. For a general group G as above we show that the orbit G(v) is closed in V if L(v) is positive. We discuss the geometric significance of having closed orbits and of the vectors of minimal length in a closed orbit.