Colleen Robles  
(Texas A&M)

Homological rigidity of Schubert varieties in compact  
Hermitian symmetric spaces

The integral homology of a compact Hermitian symmetric spaces (CHSS)  
is generated by the homology classes of its Schubert varieties. Most Schubert  
varieties are singular. In 1961 Borel and Haefliger asked: when can the  
homology class $[X]$ of a singular Schubert variety be represented by a smooth  
subvariety $Y$ of the CHSS?

Remarkably, the subvarieties $Y$ with $[Y] = [X]$ are integrals of a (linear  
Pfaffian) differential system. I will discuss recent work with Dennis The in  
which we give a complete list of those Schubert varieties $X$ for which there  
exists a first-order obstruction to the existence of a smooth $Y$. This extends  
(independent) work of M. Walters, R. Bryant and J. Hong.

The sine qua non of our analysis is a new characterization of the Schubert  
varieties by a non-negative integer and a marked Dynkin diagram. The de-
scription generalizes the well-known characterization of the smooth Schubert  
varieties by connected subdiagrams of the Dynkin diagram.

I will illustrate the talk with many examples.