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Sara C. Billey* (billey@math.washington.edu), Box 354350, Seattle, WA 98195, and **Stephen A. Mitchell**. *Smoothness and Rational Smoothness in Affine Grassmannians*.

In this talk we will introduce a topic at the intersection of topology, algebraic geometry, representation theory and combinatorics. The motivation for this work comes from the geometry associated to Kac-Moody groups, the affine Grassmannian, and loop spaces. However, the techniques required for our main theorems are simply stated in terms of combinatorial data including partitions, Weyl groups and root systems. More specifically, we will consider the question: Which affine Schubert varieties are smooth or rationally smooth in the affine Grassmannian? We will give a combinatorial characterization of these properties in terms of "affine partitions". Computer proofs were essential in the exceptional types. The intension of the talk will be to introduce the background concepts and our main theorems to a wide audience.

This talk is joint with Stephen Mitchell. (Received September 20, 2007)