October 20: Joel Kamnitzer (Berkeley), "Mirkovic-Vilonen Cycles and Polytopes." FOLLOWED BY DINNER.

Mirkovic-Vilonon showed that certain subvarieties of the Affine Grassmanian, called Mirkovic-Vilonen cycles, give bases for representations of complex semisimple groups. Anderson observed that to each MV cycle, it is possible to associate its moment map image, called a Mirkovic-Vilonen polytope. He showed that these polytopes can be used to count tensor product multiplicities.

Here, we give a uniform description of the MV cycles and polytopes for all complex semisimple groups. Our description is in terms of the combinatorics developed by Berenstein-Zelevinsky in their tensor product multiplicities paper.However, our work does not rely on their results and it gives a new proof of their tensor product multiplicity formula.

We will also explain how the MV polytopes can be used to describe different parameterizations of Lusztig's canonical basis and how they can be inductively built using a natural crystal structure.