

**November 20, 2013:** Eric Marberg (Stanford), *Canonical bases and deformations of Coxeter group representations.*

Let  $V$  be a free module over a ring of Laurent polynomials in a single indeterminate. A pre-canonical structure on  $V$  consists of a certain “bar involution” together with an inner product and a “standard basis.” With respect to such a structure, a basis for  $V$  is “canonical” if it is bar invariant, unitriangular when written in the standard basis, and “almost orthonormal.” An elementary argument shows that a pre-canonical structure admits at most one canonical basis. Canonical bases arise naturally from categorifications, and are interesting to study as they often display amazing and mysterious properties.

Given a representation of a Coxeter group, one can ask whether it deforms to a module of the corresponding Iwahori-Hecke algebra, whether this deformation has a natural pre-canonical structure, and whether for this structure a canonical basis exists. For the regular representation, all of these questions have affirmative answers and the resulting canonical basis is our prototypical example, namely, the Kazhdan-Lusztig basis of the Iwahori-Hecke algebra. In this talk I will describe some other cases where these questions make sense and have interesting answers. In particular, I will discuss the canonical bases which can be attached to deformations of various analogs of the regular representation of a Coxeter group, examined in work of Deodhar; Lusztig and Vogan; and Rains and Vazirani.