Colloquium

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Poisson structures on flag varieties

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The geometry of Poisson structures originating from Lie theory found numerous applications in representation theory, ring theory, and dynamical systems. The linear Poisson structure on the dual of a Lie algebra provides the setting for the orbit method of Kirillov, Kostant, and Dixmier for the study of the unitary duals of Lie groups and the spectra of universal enveloping algebras.

In this talk we will describe in detail the geometry of a class of Poisson structures on complex flag varieties and some of their relations to combinatorics (Schubert cells and their Deodhar partitions, cluster algebras, total positivity, the Springer and the Lusztig partitions of wonderful compactifications), ring theory (spectra of algebras of quantum matrices and other quantized algebras), integrable systems (Kogan-Zelevinsky systems). In the special case of hermitian symmetric spaces of compact type, these Poisson structures further elucidate the works of Wolf, Richardson, Röhrhle, and Steiberg on the structure of the orbits of certain Levi factors.

The talk is intended for a general audience and we will not assume any background in the subject.