THE SHARESHIAN-WACHS CONJECTURE

Speaker: Patrick Brosnan (Maryland), September 14, 2016

Abstract: In a recent paper, J. Shareshian and M. Wachs introduced a generalization of Stanley’s chromatic symmetric function and conjectured a formula relating this function to the cohomology of certain varieties called Hessenberg varieties. More precisely, the Shareshian-Wachs conjecture relates the chromatic symmetric function to a certain action, defined by J. Tymoczko, of the symmetric group on the cohomology of Hessenberg varieties.

There are now two (very different) proofs of this conjecture, one by T. Chow and myself and another by M. Guay-Paquet. I will explain the first proof focusing on its algebro-geometric aspects (but I will also try to say something about the second proof). Probably the main motivation for the Shareshian-Wachs conjecture is another conjecture of Stanley and Stembridge which is still open. In fact, Shareshian and Wachs have greatly refined and strengthened the Stanley-Stembridge conjecture. I will try to explain this refined conjecture and some of the evidence we have for it.