MISHA TYOMKIN, Dartmouth College
On numbers associated with a strong Morse function

Morse function on a manifold M is called strong if all its critical points have different critical values. Given a strong Morse function f and a field $\mathbb{F}$ we construct a bunch of elements of $\mathbb{F}$, which we call Bruhat numbers (they're defined up to sign). More concretely, Bruhat number is written on each bar in the barcode of f (a.k.a. Barannikov decomposition). It turns out that if homology of M over F is that of a sphere, then the product of all the numbers is independent of f. We then construct the barcode and Bruhat numbers with twisted (a.k.a. local) coefficients and prove that the mentioned product equals the Reidemeister torsion of M. In particular, it's again independent of f. This way we link Morse theory to the Reidemeister torsion via barcodes. Time permitting, we will also discuss how parametric Morse theory comes into play. Based on a joint work with Petya Pushkar.