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Polytopes, toric varieties, and the intersection homology of moduli spaces of semistable bundles

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Abstract. Toric varieties are intimately related to the combinatorics of polytopes, and I will describe an important example of such a relation linked to certain natural Lie-theoretic data. I will show then how, calculating intersection homologies of these varieties brings us to a beautiful new formula for the intersection Betti numbers of moduli spaces of semistable bundles on Riemann surfaces. This problem has a long history, which began with the works of Frances Kirwan in the 1980's, and saw a recent breakthrough by Mozgovoy and Reineke. I will be reporting on joint work with Camilla Felisetti and Olga Trapeznikova.