

**Estanislao Herscovich**

Université Grenoble Alpes - Universidad de Buenos Aires - CONICET, France - Argentina

Estanislao.Herscovich@ujf-grenoble.fr

In this talk I will recall the basic theory of  $A_\infty$ -algebras, which were introduced by J. Stasheff in 1963. Even though they appeared within the realm of algebraic topology, I will present several examples of their use in representation theory and in homological algebra. In particular, in the last part of the talk I will show that the torsion theory of  $A_\infty$ -algebras naturally allows to compute the cup and cap products on Hochschild cohomology and homology of any nonnegatively graded connected algebra, respectively.