Secondary Polytopes and Toric Moduli Spaces

Victor Batyrev (University of Tübingen)
victor.batyrev@uni-tuebingen.de

Anogia, Crete, August 2005

Let $\Delta \subset \mathbb{R}^n$ be an n-dimensional lattice polytope, i.e. all vertices of Δ belong to the lattice $\mathbb{Z}^n$. Consider a finite subset $A \subseteq \Delta \cap \mathbb{Z}^n$ containing all vertices of Δ.

More then 15 years ago Gelfand, Kapranov and Zelevinski introduced the notion of *secondary polytope* $\mathrm{Sec}(A) \subset \mathbb{R}^{|A|-n-1}$ as the Newton polytope of some polynomial (so called *principal A-determinant*) associated with A. They proved that vertices of $\mathrm{Sec}(A)$ 1-to-1 correspond to coherent triangulations of Δ with vertices in A.

Later it turned out that projective toric varieties corresponding to secondary polytopes can be interpreted as *moduli spaces* of some geometric objects having interesting applications in algebraic geometry and theoretical physics.

The purpose of the talk is to give an introduction to this topic.