Abstract In 1998, a wonderful correspondence between certain ideals and convex geometry was introduced by Musson and Van den Bergh. Namely, for an algebra closely related to the Weyl algebra $k[x_1, \ldots, x_n, \partial_1, \ldots, \partial_n]$ (a polynomial ring together with derivations), one wants to study the primitive ideals therein, i.e. the annihilators of simple modules. For this purpose it is enough to study special simple modules on which the action can be described in terms of lattices and polyhedral cones. The first part of the talk explains this correspondence and illustrates it by a small example.

In the second part of the talk, we use this description of the primitive ideals and go one step further: We want to describe the primitive quotients of our algebra, i.e. the quotients by the primitive ideals, in particular measure their size by computing their Goldie ranks. This can be done using the geometrical picture: From the description of Part I, we derive appropriate polytopes to which one may apply Ehrhart theory. Then for each nice family of such quotients, we obtain one common quasi-polynomial for the computation of the Goldie rank.