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Benjamin J Braun* (benjamin.braun@uky.edu), 715 Patterson Office Tower, Department of Mathematics, University of Kentucky, Lexington, KY 40506, and **Matthias Beck**, San Francisco State University. *Euler-Mahonian Statistics via Polyhedral Geometry*.

A variety of descent and major-index statistics have been defined for symmetric groups, hyperoctahedral groups, and their generalizations. Typically associated to pairs of such statistics is an Euler-Mahonian distribution, a bivariate generating function identity encoding these statistics. We use techniques from polyhedral geometry to establish new multivariate generalizations for many of the known Euler-Mahonian distributions. The original bivariate distributions are then straightforward specializations of these multivariate identities. A consequence of these new techniques are bijective proofs of the equivalence of the bivariate distributions for various pairs of statistics. This is joint work with Matthias Beck. (Received August 22, 2012)