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**Stefan A. Forcey\*** ([sforcey@tnstate.edu](mailto:sforcey@tnstate.edu)). *New Hopf algebra structures on compositions.*

Compositions, or bijectively boolean subsets, form the graded basis for the very important combinatorial Hopf algebra of quasisymmetric functions. Now, via a description of the simplices as cellular projections of associahedra, we introduce a new graded algebra with the  $n^{\text{th}}$  component of its basis the vertices of the standard  $(n - 1)$ -simplex. We extend this new algebra to a new graded Hopf algebra based upon the full face posets of simplices: the boolean posets. Next, from a description of the cubes as projections of the multiplihedra, comes another new Hopf algebra based upon the compositions illustrated as painted trees. Mysteriously, it appears that our two new algebras are in fact dual to each other. (Received January 26, 2010)