1152-52-229 **Jean-Philippe Labbé*** (labbe@math.fu-berlin.de), Arnimallee 2, Institut für Mathematik, 14195 Berlin, Germany. *Convex Geometry of Subword Complexes of Coxeter Groups.*

The associahedron has a natural extension called the multiassociahedron. It is a vertex-decomposable simplicial sphere (in other words, a "combinatorially nice" sphere). Since at least 2003, people tried to construct simplicial polytopes, whose boundary is this simplicial complex, with limited success. A potential explanation for this situation lies in (at least) three combinatorial "known-to-be-challenging" computational problems which should be indispensably faced to solve this problem.

This contribution presents a glimpse of the foundations of an approach grouping together notions from multilinear algebra, Schur functions, combinatorics of reduced words, Gale duality, and finally oriented matroids. This approach leads to a class of "universal" oriented matroids to realize subword complexes geometrically, and to several essential open problems related to the combinatorics and geometry of Coxeter groups. (Received September 05, 2019)