The combinatorics of poset associahedra

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Based on joint work with Colin Defant and Son Nguyen

For a poset P, Galashin introduced a simple polytope $\mathscr{A}(P)$ called the P-associahedron. We will show that the f-vector of $\mathscr{A}(P)$ depends only on the comparability graph of P. Furthermore, we will show that when P is a rooted tree, the 1-skeleton of $\mathscr{A}(P)$ orients to a lattice, answering a question of Laplante-Anfossi. These lattices naturally generalize both the weak order on permutations and the Tamari lattice.