BRUCE SAGAN, Michigan State University
On a rank-unimodality conjecture of Morier-Genoud and Ovsienko

Let $\alpha = (a, b, \ldots)$ be a composition. Consider the associated fence poset $F(\alpha)$ whose covering relations are

$$x_1 \lhd x_2 \lhd \ldots \lhd x_{a+1} \rhd x_{a+2} \rhd \ldots \rhd x_{a+b+1} \lhd x_{a+b+2} \lhd \ldots \ .$$

We study the distributive lattice $L(\alpha)$ of all lower order ideals of $F(\alpha)$. These lattices are important in cluster algebras and in constructing q-analogues. In particular, we make progress on a recent conjecture of Morier-Genoud and Ovsienko that $L(\alpha)$ is rank unimodal. We show that if one of the parts of α is greater than the sum of the others, then the conjecture is true. We conjecture that $L(\alpha)$ enjoys the stronger properties of having a nested chain decomposition. We verify that these properties hold for compositions with at most three parts generalizing work of Claussen and simplifying a construction of Gansner. This is joint work with Thomas McConville and Clifford Smyth.