Patterns and Compositions

RACHEL DOMAGALSKI, Michigan State University
Pattern Avoidance in Circular Permutations

A circular permutation avoids a given pattern if it does not contain a subsequence equivalent to that pattern. We find the number of circular permutations that avoid all different pairs and triples of length 4 patterns. This is joint work with Dr. Bruce Sagan, Jinting Liang, Quinn Minnich, Jamie Schmidt, and Alexander Sietsema.

JINTING LIANG, Michigan State University
Generating functions over avoidance sets of circular permutations

Motivated by the study of enumeration of circular permutations avoiding a given pattern, we study and obtain an explicit formula for the generating function of circular descents, cdes, over the set of circular permutations avoiding a single four letter pattern. This is joint work with Dr. Bruce Sagan, Rachel Domagalski, Quinn Minnich, Jamie Schmidt and Alexander Sietsema.

GABRIEL LOOS, Georgia Southern University
Combinatorics of Cyclic Compositions

Integer compositions are ordered sequences of positive integers that sum up to a given integer. We use generating functions to study cyclic versions of compositions, colored compositions under various constraints. First, a general construction of the generating functions for cyclic compositions (or their parts) is established. With this generating function we look to find and justify patterns from the number of cyclic compositions or number of parts in the cyclic compositions.

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

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

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.

HUA WANG, Georgia Southern University
Counting colored compositions and tilings

A composition of a given positive integer n is an ordered sequence of positive integers with sum n. In n-color compositions a part k has one of k possible colors. Using spotted tiling to represent such colored compositions we consider those with restrictions on colors. With general results on the enumeration of color restricted n-color compositions in terms of allowed or prohibited colors, we introduce many particular combinatorial observations related to various integer sequences and identities. This is joint work with Brian Hopkins.