Elegant and Discrete Mathematics
(Org: **Karen Meagher** (University of Regina))

KAREN MEAGHER, University of Regina
All 2-transitive groups have the Erdos-Ko-Rado Property

The Erdős-Ko-Rado (EKR) theorem gives the size of the largest family of intersecting subsets of a set. For any object where a notion of intersection is defined, it can be asked if a version of the EKR theorem holds. Two permutations are intersecting if they both map some i to the same point. With this definition, versions of the EKR theorem have been proven for many different specific groups. Recently Pablo Spiga, Pham Huu Tiep and I determined the size of the maximum intersecting set of permutations from any 2-transitive group. I will present this elegant result.

MARNI MISHNA, Simon Fraser University
On the complexity of the cogrowth sequence

Given a finitely generated group G with generating set S consider the number of words of length n over the alphabet S equal to one. This defines the cogrowth sequence, and is related to excursions on Cayley graphs.

We survey the surprising connections between the structure of the group, and properties of this sequence. We show that the cogrowth sequence is not P-recursive when G is an amenable group of superpolynomial growth and compute the exponential growth of the cogrowth sequence for certain infinite families of free products of finite groups and free groups. Work in collaboration with Jason Bell.

JESSICA STRIKER, North Dakota State University
Bijections - Marvelous, Mysterious, and Missing

An elegant way to show two sets are equinumerous is to exhibit an explicit bijection between their elements. Such a bijection should, ideally, preserve important statistics on the objects. In this talk, we discuss such elegant bijections involving permutations, Catalan objects, plane partitions, and alternating sign matrices and also discuss equinumerous sets for which no such bijection is known.

STEPH VAN WILLIGENBURG, Univeristy of British Columbia
The positivity of trees

The chromatic polynomial was generalized to the chromatic symmetric function by Stanley in 1995, and started two research directions. Firstly, does the chromatic symmetric function distinguish trees, and secondly when can the chromatic symmetric function be written as a positive linear combination of elementary symmetric functions.

In this talk we meld these two directions and discover when the chromatic symmetric function of trees is not a positive linear combination of elementary symmetric functions, using a beautiful but overlooked result of Wolfgang III from 1997.

This is joint work with Samantha Dahlberg and Adrian She.

HANMENG (HARMONY) ZHAN, Université de Montréal
Some elegant results in algebraic graph theory

I will talk about some elegant results in algebraic graph theory.