## Convex Geometry

(Org: **Sinai Robins** (University of São Paulo, Brazil))

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*The Kneser-Poulsen conjecture for uniform contractions*

The Kneser-Poulsen Conjecture (1955) states that if the centers of a family of $N$ unit balls in $\mathbb{E}^d$ is contracted, then the volume of the union (resp., intersection) does not increase (resp., decrease). We consider the following special contractions. A uniform contraction is a contraction where all the pairwise distances in the first set of centers are larger than all the pairwise distances in the second set of centers. We prove that a uniform contraction of the centers does not decrease the volume of the intersection of the balls, provided that $N \geq (1+\sqrt{2})^d$. Our result extends to intrinsic volumes. We prove a similar result concerning the volume of the union. This is a joint work with M. Naszodi (Eotvos Univ., Budapest, Hungary).

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**ANTOINE DEZA**, McMaster University

*Lattice polytopes with large diameter and many vertices*

A lattice $(d,k)$-polytope is the convex hull of a set of points in dimension $d$ whose coordinates are integers between $0$ and $k$. In this talk, we will introduce lattice polytopes generated by the primitive vectors of bounded norm. These primitive zonotopes can be seen as a generalization of the permutahedron of type $B_d$. We will highlight connections between the primitive zonotopes and the largest possible diameter of lattice $(d,k)$-polytopes, and between the computational complexity of multicriteria matroid optimization. Tightening of the bounds for the largest possible diameter of lattice $(d,k)$-polytopes, complexity results, conjectures, and open questions will be discussed.

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**DMITRY FAIFMAN**, University of Toronto

*The polytope algebra inside the space of generalized valuations*

McMullen's polytope algebra is a central object in convex geometry, with close ties to algebraic geometry. In this talk we will recall several constructions from the theory of convex valuations, and then proceed to discuss how the polytope algebra can be studied analytically by densely embedding it into the space of generalized valuations with the convolution product. Based on a joint work with A. Bernig.

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**ALEXANDER KOLPAKOV**, University of Toronto

*Triangulations of surfaces and conjugacy classes in the modular group*

In this talk, we shall review counting techniques for maps on surfaces related to subgroup counting in infinite groups introduced by Breda-d'Azevedo, Nedela and Mednykh, rather then the classical approach based on the symmetric group and developed by Jones and Singerman, Bousquet-Mélou, Goulden and Jackson, and many other authors. We shall apply these techniques to the modular group in order to count the number of triangulated surfaces with $n$ triangles up to (triangulation-preserving) homeomorphism.