

# Applications of Association Schemes to Combinatorial Problems

## Organizer(s):

Karen Meagher (University of Waterloo)

## Description:

Algebraic combinatorics is a growing field of study that has proven to be a powerful method for solving combinatorial problems. A key structure in algebraic combinatorics is the association scheme; association schemes are general combinatorial objects with a strong algebraic nature.

The goal of this session is to present several problems that fit in the framework of an association scheme and to show how we can find results for these combinatorial problems using this structure.

Chris Godsil will give the first presentation which will provide an introduction to association schemes. The remaining presentations will focus on applications to combinatorial problems.

## Titles and Speakers:

- *Association schemes and their applications*  
Chris Godsil (University of Waterloo)
- *Association Schemes and Set-Partition Systems*  
Karen Meagher (University of Waterloo)
- *Association schemes in complex systems of lines*  
Aidan Roy (University of Calgary)
- *Inequalities for binary codes from the Terwilliger algebra*  
William J. Martin (Worcester Polytechnic Institute, visiting MIT))
- *A strengthening of the Assmus-Mattson theorem based on the displacement and split decompositions*  
Hajime Tanaka (Worcester Polytechnic Institute)
- *Distance-regular graphs and the quantum affine  $\mathfrak{sl}_2$  algebra*  
Paul Terwilliger (University of Wisconsin in Madison)