

DALHOUSIE MATHEMATICS COLLOQUIUM

Thursday March 1, 2:30 pm, Chase 319

Speaker: Adam Van Tuyl
(McMaster University)

Studying graphs using commutative algebra and combinatorial algebraic topology

In the early 1990s, R. Villarreal described how to associate a finite simple graph a monomial ideal in a polynomial ring. This construction allows us to use tools in commutative algebra to study graphs, or alternatively, results in graph theory can be used to derive algebraic results. Because monomial ideals can also be associated to abstract simplicial complexes via Stanley-Reisner theory, we can construct a dictionary between finite simple graphs, monomial ideals, and abstract simplicial complexes. In this talk I will introduce the correspondence between these three areas and give examples of the dictionary in action. Among other things, I will explain how the chromatic number of a graph can be encoded algebraically and how to classify perfect graphs using commutative algebra.