

**Title: Graph Density Inequalities, Sums of Squares and Tropicalization**

**Speaker: Annie Raymond**

**Abstract:** Establishing inequalities among graph densities is a central pursuit in extremal graph theory. One way to certify the nonnegativity of a graph density expression is to write it as a sum of squares or as a rational sum of squares. In this talk, we will explore how one does so and we will then identify simple conditions under which a graph density expression cannot be a sum of squares or a rational sum of squares. Tropicalization will play a key role for the latter. This is joint work with Greg Blekherman, Mohit Singh, and Rekha Thomas.