

# Discrete Mathematics Seminar

Illinois State University

1:00–1:50 pm, February 23

Speaker: Zilin Jiang, Arizona State University

## Forbidden subgraphs and spherical two-distance sets

A set of unit vectors in a Euclidean space is called a spherical two-distance set if the pairwise inner products of these vectors assume only two values  $\alpha$  and  $\beta$ . It is known that the maximum size of a spherical two-distance grows quadratically as the dimension of the Euclidean space grows. However when the values  $\alpha$  and  $\beta$  are held fixed, a very intricate behavior of the maximum size emerges. Building on our recent resolution in the equiangular case, that is  $\beta = -\alpha$ , we make a plausible conjecture which connects this behavior with spectral theory of signed graphs in the regime  $\beta < 0 \leq \alpha$ , and we confirm this conjecture when  $\alpha + 2\beta < 0$  or  $(1 - \alpha)/(\beta - \alpha) < 2.0198$ . Joint work with Alexandr Polyanskii, Jonathan Tidor, Yuan Yao, Shengtong Zhang and Yufei Zhao.

